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TURNING WASTEPAPER INTO JOBS

Increasing Massachusetts Primary Pulp and Paper Manufacturers' Competitiveness and Use of Recovered Paper

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The Department of Environmental Protection (DEP) and the Industrial Services Program (ISP) wish to thank all of the companies that were interviewed for this project. All 26 paper and pulp companies with a manufacturing presence in Massachusetts participated in the study. They represent all 38 active primary mills in the state. (Seven companies have multiple mills.) DEP and the ISP also are grateful to the four paper converters and one recycling center that were also willing to be interviewed for this project. The data gathered during interviews with these companies were used to establish a broader understanding of some issues, but were not included in the summary statistics for this report.

The survey of the pulp and paper companies, and the report itself, could not have been accomplished without the efforts of Belinda Bothwick and Beverly Cadorette. Belinda's knowledge of, and experience in, the paper industry brought much needed insight to the scope of the study. Beverly's analytical and writing talents were essential to producing this report. We are also very grateful for the editorial support provided by Ken Mayo.

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EXECUTIVE SUMMARY

Background and Objectives

This report summarizes the findings of a four-month study of the Massachusetts paper industry, which was sponsored by the Massachusetts Department of Environmental Protection (DEP) and the Industrial Services Program (ISP).

The study had two complementary objectives:

- To identify opportunities for increasing the competitiveness of primary pulp and paper manufacturers, and
- To identify opportunities for sustaining or increasing the use of recovered paper by Massachusetts paper manufacturers.

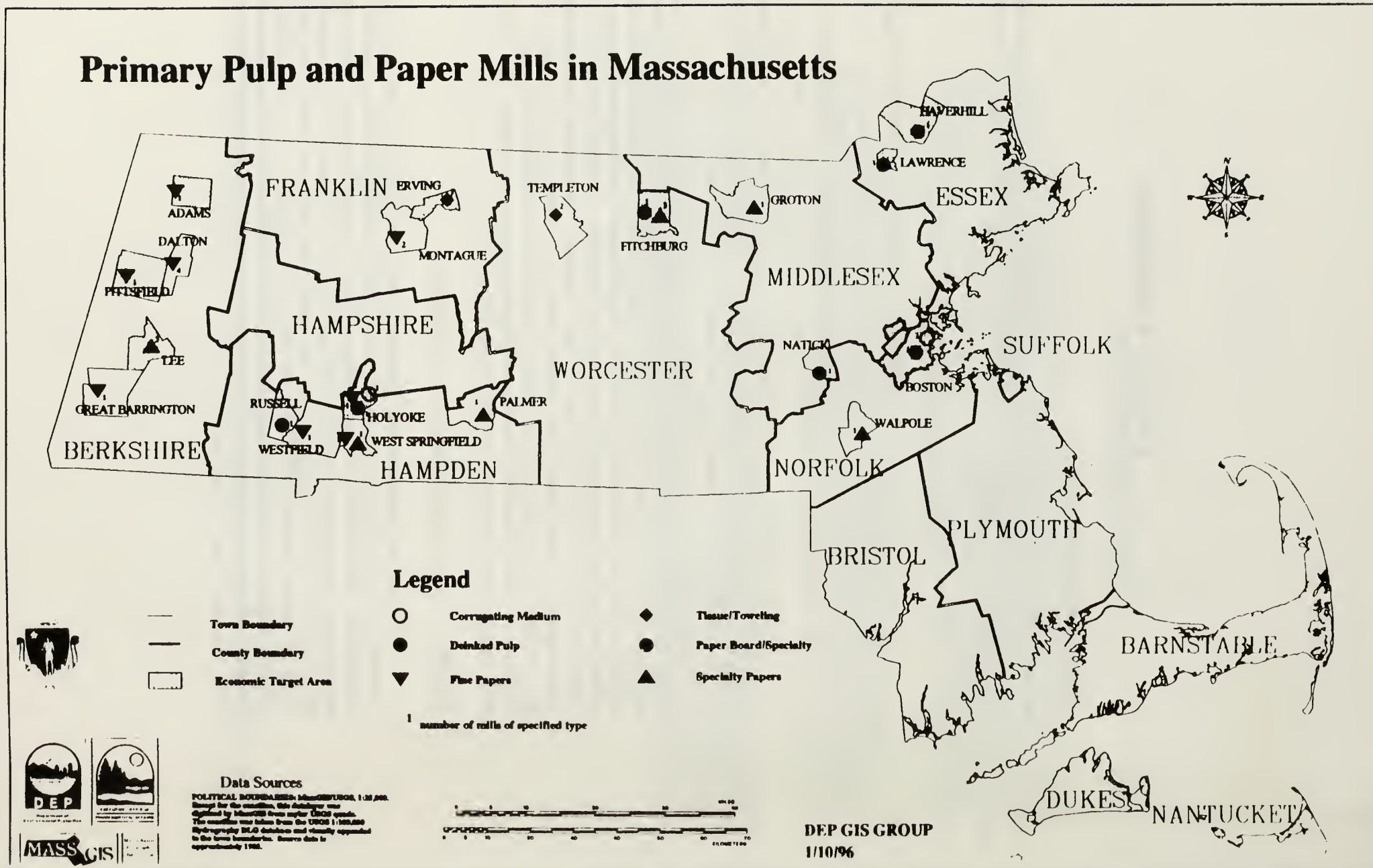
The study was designed to serve as a starting point for collaboration by DEP, the ISP, and other parties interested in working with the state's paper industry to help meet the state's economic-development and recycling goals.

This report is based on in-depth interviews with 26 paper companies representing all 38 active primary pulp and paper mills in Massachusetts, supplemented by information gathered from a number of industry experts. It is organized into five chapters. Chapter 1 describes the project background and methodology used for data collection and analysis. Chapter 2 examines the competitive issues that affect primary pulp and paper manufacturers. It also provides information on existing programs aimed at helping manufacturers meet these challenges. Chapter 3 discusses the factors that influence the use of recovered paper by primary pulp and paper manufacturers. The chapter also identities a number of programs aimed at addressing these issues. Chapter 4 provides recommendations on ways the Commonwealth could increase the effectiveness of its assistance to the paper industry. Finally, Chapter 5 describes plans for following up on the work summarized in the report.

Overview of the Massachusetts Paper Industry

The primary pulp and paper manufacturers of Massachusetts employ more than 4,500 people, representing a total payroll of $147 million, and annually contribute $580 million of value added to the state economy. Most of the pulp and paper mills are located in "economic target areas," where local economies depend heavily on their viability (see Figure ES-1.) In many cases, the pulp and paper mills are one of the few local sources of high-paying manufacturing jobs, paying, on average, wages of about $12.50 per hour and salaries of $37,000 per year. Thousands of other jobs, in turn, rely on the mills. They include jobs in printing and conversion operations, wastepaper recovery and processing, paper-making machinery manufacturing, energy and transportation, and a host of service businesses such as cleaning and food.

Figure ES-1: Primary Pulp and Paper Manufacturers



The economic challenges faced by the Massachusetts paper industry are perhaps best illustrated by the fact that, in the past five years, 10 of the state's 41 mills have shut down or changed hands. Three of these mills remain idle, leaving the state with 38 active mills.

Massachusetts' primary pulp and paper mills tend to be smaller, older facilities which compete primarily by serving specialized markets and by offering their customers higher-quality products or more responsive, customized service than do larger paper companies. Most mills operate 24 hours a day, 7 days a week. They use hundreds of millions of dollars worth of equipment and machinery, and consume significant amounts of energy.

The study identified several competitive advantages of companies that make paper in Massachusetts: a skilled workforce, a core competency, a well-developed infrastructure, and extensive educational resources. Several competitive disadvantages were also identified. They include the costs of energy, environmental regulation, health care, unemployment insurance, worker's compensation, and state taxes. This report identifies a number of state programs that can provide financial and technical assistance to help paper manufacturers meet these challenges.

Use of Recovered Paper

Each year, 30 of the state's 38 active primary pulp and paper manufacturers use more than 800,000 tons of recovered paper to make a wide range of recycled products, including tissue and toweling, corrugating medium, egg cartons, pizza boxes, writing paper, file folders, and tube board. The recovered paper comes from sources throughout the Northeast. Located closer to sources of wastepaper than to sources of virgin fiber, many Massachusetts paper mills use recovered paper to reduce their raw material costs, as well as to meet increasing consumer demand for recycled products.

Massachusetts businesses and residents generate approximately 2.6 million tons of wastepaper per year. Approximately 840,000 tons of that waste is recycled. Different raw material needs and end products drive recovered-paper markets to extend beyond state lines. However, if Massachusetts is to meet its goal of recycling 46 percent of its waste by the year 2000, it must support local industries that are capable of using recovered materials—including paper—as manufacturing feedstock.

To the degree that using recovered paper also provides the state's paper mills with a competitive advantage, there can be considerable overlap of the state's economic development and environmental objectives. This is clearly illustrated by Massachusetts Recycling Associates' $190 million investment in a deinking pulp mill at the site of a closed paper mill in Fitchburg. Scheduled for start-up later this year, the mill will create 125 jobs and provide strong economic incentives to increase collections of its primary raw material, office wastepaper.

The study revealed that, while the products mills make determine their ability to use recovered paper as a raw material, all mills face similar barriers to increasing their use of recovered paper. Among these barriers are the quality and consistency of recovered paper, the costs of obtaining and using it, the effects that using recovered paper has on a mill's products, and the demand for recycled products on the part of a mill's customers. This report describes each of these factors and identifies several state programs aimed at addressing them.

Recommendations and Next Steps

The study generated ideas for several steps that state government and other relevant organizations can take to increase the competitiveness of Massachusetts pulp and paper manufacturers and to sustain or increase their use of recovered paper. Many involve building on the existing programs of several agencies.

Each recommendation has something to do with helping paper manufacturers make capital or operating improvements that will lead to long-term economic viability, job retention or creation, and sustained or increased use of recovered paper. Some recommendations envision direct assistance, while others call for actions that affect the mills' operating environment. The report's recommendations include:

- Enhancing communication between pulp and paper manufacturers and state assistance programs,
- Making existing state programs easier to access,
- Developing training programs for the employees of pulp and paper manufacturers,
- Promoting partnerships between universities and manufacturers on research and development,
- Providing technical assistance in meeting regulatory requirements,
- Providing access to capital through grants or loans,
- Helping companies reduce energy costs,
- Increasing the supply of recovered paper, and
- Increasing the demand for recycled products.

To follow up on this report, the ISP (with DEP funding) will assemble a focus/solutions group of paper manufacturers and state assistance providers to prioritize the most promising ways of assisting the Massachusetts paper industry. The group may consider:

- Establishing or building upon paper industry networks,
- Developing, for the state's economic development community, a workshop or training on the paper industry, and
- Working with universities or other organizations to develop employee-training or research-and-development programs responsive to the paper industry's needs.

In addition, the ISP will continue to provide direct assistance to paper mills, when appropriate. DEP will continue its efforts to promote increased recovery of wastepaper and increased demand for recycled products.

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1.0 PROJECT BACKGROUND

The Industrial Services Program (ISP) and the Department of Environmental Protection (DEP) have jointly sponsored a study of the primary manufacturing segment of the pulp and paper industry in Massachusetts. This study is one step in a larger process of increasing the primary pulp and paper manufacturers' awareness of existing state programs, and in making those programs more responsive to the manufacturers' needs by serving as the catalyst in helping policy-makers to:

- Characterize common issues that affect the economic viability of the industry; and
- Identify alternatives for assisting the industry and increasing its use of recovered paper in the manufacturing process.

1.1 Importance of Paper Industry to the Massachusetts Economy and to Recycling

The primary pulp and paper manufacturers[1] of Massachusetts currently employ 4,500 people, representing a total payroll of $147 million, and annually contribute $580 million dollars of value added to the state economy.[2] Figure 1 on the next page shows, by county:

- The number of people employed by the primary pulp and paper manufacturers,
- The tonnage of products manufactured, and
- The tonnage of recovered paper used.

Because these jobs and output are associated with the manufacturing sector, the pulp and paper manufacturers' contribution to the state economy is even greater than these figures show. The Economic Policy Institute has found that every 100 jobs in the manufacturing sector generate 422 additional jobs in the economy.[3] Based on that finding, the primary manufacturing segment of the paper industry generates over 17,000 additional jobs in other economic sectors (such as electric services, gas production and distribution, transportation, converting, printing, paper-making equipment manufacturing, logging, and secondary fiber collection and sales).

As shown in Figure 2, most of Massachusetts' pulp and paper mills are located in "economic target areas." The mills are a major economic force in these areas, which meet state-designated criteria for economic need and distress, and the paper industry represents an important sector of the Massachusetts economy. In Berkshire County alone, the paper mills surveyed employ more than 1,750 people.

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[1] Unless otherwise indicated, the study focused on primary pulp and paper manufacturers rather than "converters" and "container plants."

[2] Robin Ingenthron, DEP; "Value Added by Recycling Industries in Massachusetts;" July 1992; p.1.

[3] Kerry Sutton: Northeast-Midwest Institute: *Trends in Manufacturing in the Northeast-Midwest*: July 1993; pp 12-13.

Figure 1: The Massachusetts Paper Industry

COUNTY	# OF FACILITIES	# OF EMPLOYEES	PRODUCT TONNAGE (TONS/YR)	RECYCLED TONNAGE* (TONS/YR)
BERKSHIRE	12	1,751	126,625	37,843
ESSEX, MIDDLESEX	6	581	140,880	83,885
FRANKLIN	3	381	66,000	58,702
HAMPDEN	8	923	183,850	161,645
NORFOLK, SUFFOLK	3	313	119,750	157,000
WORCESTER	6	772	287,000	318,110
TOTALS	**38**	**4,721**	**924,105**	**817,185**

*Note: The tonnage of wastepaper can exceed the product tonnage because a portion of the wastepaper (the shorther, weaker fibers) wind up as a byproduct of papermaking, rather than in the paper itself.

Massachusetts pulp and paper manufacturers also are essential to the Commonwealth's recycling efforts. Using approximately 800,000 tons of recovered paper per year, paper and pulp mills manufacture recycled products such as:

- Deinked pulp.
- Tissue and toweling.
- Corrugating medium.
- Egg cartons.
- Pizza boxes.
- High-end writing paper.
- File folders.
- Tube board, and
- Shoe insoles.

Approximately 30 of the 38 active primary pulp and paper manufacturers in Massachusetts have at least some recycled product lines. These companies comprise an important market for recovered paper.

1.2 Project Sponsors and Goals

Government actions are more likely to stimulate growth when policy is based on a solid understanding of what is needed to create a more competitive economy. The ISP's primary interest in this project is to improve the competitiveness and success of the paper industry and to preserve a source of jobs within the Commonwealth by improving communication among the paper industry, policy makers, and state assistance programs. This review of the paper industry is an important part of this process.

The DEP recognizes that maintaining a viable market for waste paper is an essential component of its recycling program. In its 1995 Solid Waste Master Plan Update, DEP reaffirmed its target for the year 2000 of recycling 46 percent of the waste generated in Massachusetts. Waste paper accounts for 38 percent of the total waste stream, and 50 percent of the waste material recycled. To meet its target, therefore, DEP must continue to increase the collection of waste paper and cultivate a healthy market for this material.

The goal of this study is to identify opportunities for increasing the competitiveness of primary pulp and paper manufacturers and sustain or increase their use of waste paper. The most promising opportunities to meet both goals are those which:

- Allow an otherwise failing company that uses recovered paper to stay in business;
- Enable a company to make a process change that increases its use of recovered paper;
- Allow for productivity improvements that increase the use of recovered paper; or
- Provide capital or operating assistance to cultivate new businesses that use recovered paper in their manufacturing processes.

In addition, actions that enhance the ability of these companies to manufacture recycled products, or that allow them to use recovered paper more inexpensively, may also make the entire industry more competitive.

1.3 Overview

This report should be useful to economic development agencies, policy makers (such as state legislators), paper companies, and anyone interested in the following issues:

- The importance of the paper industry to the Massachusetts economy;
- Competitiveness of the paper industry;
- Impediments to, and opportunities for, expansion; and
- Barriers and incentives affecting the use of recovered paper by the paper industry.

The report examines the alternatives suggested by the companies interviewed for:

- Resolving recycling or overall economic issues; and
- Capitalizing on opportunities for expanding operations.

This report provides an overview of the problems shared by primary pulp and paper manufacturers in Massachusetts. It also identifies existing state assistance programs and ways that companies can approach the agencies that administer the programs. (See Appendix A. More-detailed information on state assistance programs is being sent to pulp and paper manufacturers under separate cover.) Finally, the report provides some specific suggestions and outlines an ongoing process for addressing the competitive and recycling issues that have been identified.

1.4 Methodology

The DEP and the ISP entered into a joint agreement to hire a recycling-business consultant to work with the state's paper mills and explore how to improve their economic efficiency through their continued or expanded use of waste paper as a raw material. This collaborative study is part of a pilot effort to encourage the state's economic development agencies to expand the business-planning assistance they offer to recycling-related businesses. DEP contributed the majority of the funding for this study, which was managed by the ISP.

The ISP's interest in managing this study evolved from its 11 years of providing business assistance, workforce training, management counseling, and financial assistance to Massachusetts-based manufacturers. The study was set up in such a way that, if a paper mill was found to have a need that could be addressed by a state program, the recycling business consultant would refer that mill to the appropriate

state assistance program. For example, a mill might need help with financing, permitting, training, marketing, energy/environmental concerns, or manufacturing /processing-related issues.

A primary objective of the DEP - ISP collaboration was the preparation of a written report that (1) identifies the key business challenges faced by the state's paper recycling industry and (2) recommends ways the state government and economic development agencies can help to strengthen the paper industry. The DEP and the ISP wanted to identify, with the help of the state's paper mills that were interviewed, the barriers to continued or increased use of recovered paper as manufacturing feedstock. The study sponsors also wanted to identify opportunities for overcoming these barriers in ways that improve the economic viability of the state's paper industry, and they wanted to recommend potential actions by state government to help paper mills take advantage of these opportunities.

From March to June of 1995, a paper-industry expert conducted in-depth interviews of 26 companies, representing all 38 of the active primary pulp and paper mills in Massachusetts (Appendix B). In most cases, either the top executives or the regional manager of each firm was interviewed. Often, the interviewer spoke with several people, including the managers of such functional areas as the operations, technical, purchasing, and finance departments, and with hourly employees. The companies participated in the study on the condition that proprietary, company-specific information be kept confidential. Consequently, this report summarizes the aggregate data collected and does not present much information about individual companies.

The study focused on primary pulp and paper manufacturers. Unless otherwise indicated, statistical data on "converters" and "container plants" were not included in the study because such operations simply transform a paper mill product into an end product; they do not directly use waste paper. For example, a converter might make cardboard using corrugating medium and other manufactured materials, and a container plant might then assemble a box with the cardboard. While this sector does not directly affect the net use of recovered paper, it is an important link in the economic chain of the entire paper industry. Four paper converters and one recycling center were interviewed for this study to establish a broader understanding of some competitive and recycling issues identified by primary pulp and paper manufacturers.

Initially, the ISP and DEP developed a preliminary list of topics. These topics were pilot tested in interviews with four different companies. After reviewing the results, the ISP and the DEP worked with the paper-industry expert who conducted the interviews to refine the list of topics (See Appendix C). Since all the pulp and paper companies in Massachusetts participated in the study, this report presents a comprehensive overview of the issues facing the primary manufacturing segment of the paper industry.

Once this study is reviewed by the paper industry, policy makers, and economic development agencies, the ISP will assemble a focus/solutions group to review the report and identify ways to assist primary manufacturers. The group may decide to:

- Establish new industry networks,
- Expand existing networks,
- Develop a curriculum for training the state's economic development community in how to assist the paper industry, or
- Work with universities and other state and local groups to develop employee-training or research-and-development programs that are responsive to the needs of the industry.

Having examined the issues and problems confronting primary manufacturers, the ISP and DEP hope to work with existing state capital and technical assistance programs to make them more accessible and responsive to the needs of the paper industry.

2.0 COMPETITIVE ISSUES THAT AFFECT PRIMARY PULP AND PAPER MANUFACTURERS

The paper industry appears to be one traditional manufacturing segment in which Massachusetts can remain competitive through innovation, training, the capture of niche markets, and the development and use of new technology.[4] This chapter summarizes the competitive issues that affect primary pulp and paper manufacturers.

2.1 Pulp and Paper Manufacturing is Capital Intensive

Papermaking began as an art, and there are still people who make very high-quality paper by hand and sell it by the sheet. Companies that make paper, however, depend upon low-cost, high-volume production to remain in business. As Figure 3 shows, the average paper machine is as long as a football field and as tall in places as a two-story building. A new paper machine costs from less than $100 million to several hundred million dollars, not including the cost of pulping equipment or the building and other infrastructure needed to house the machine.

Figure 3: A Paper-Making Machine

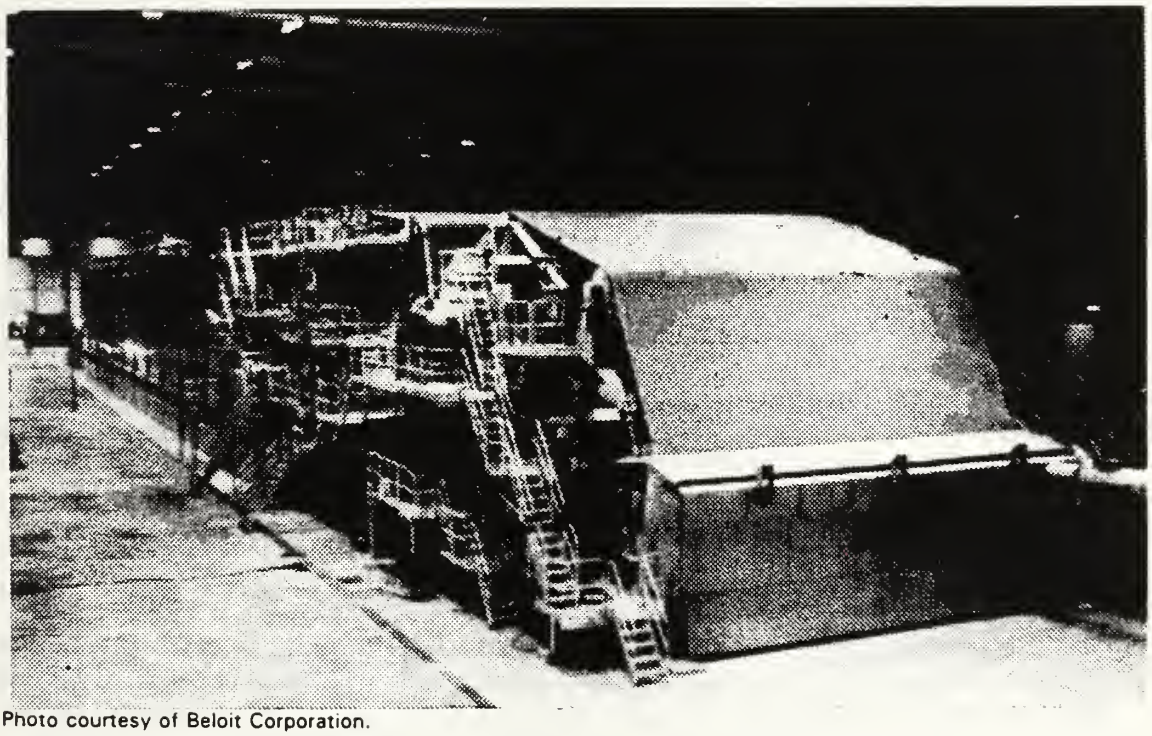

Photo courtesy of Beloit Corporation.

[4] Executive Office of Economic Affairs and University of Massachusetts; "A Statewide Strategy for Job Creation and Economic Growth;" May 1993; p. 96.

An average paper machine is a collection of enormous moving steel parts. It starts with the headbox, where the "furnish" (a mixture of approximately 97 percent water and 3 percent fiber and chemicals) is manipulated and fed onto the forming area. From the forming area through the press and drying sections of the machine, one of the primary goals of the process is to remove the vast majority of that water from the fiber mat as the sheet of paper is formed. The finished sheet contains, on average depending on the product, only 5 percent moisture. Making paper requires a large amount of energy, both for the steam required in the drying process and to power the turbines and drives that keep this massive equipment running 24 hours per day, 7 days per week.

Each paper machine is designed to produce a specific range of products at the quality level and with the efficiency necessary to be competitive. As market needs change, it is extremely expensive to make the physical modifications to a machine that are required to stay in business. As the technology has advanced, customers have come to expect even higher levels of quality. Consequently, more-expensive computer-driven process-control systems are necessary, and the purchase price of a machine is only the beginning of major annual capital outlays to meet customer needs.

Over the last few years (and including projections through 1997) United States mills purchasing new paper-making equipment spent on average $203,200,000. The cost of this equipment ranges from $10.5 million to $380.0 million.[5] Examples of proposed or current capital improvements being considered by Massachusetts pulp and paper mills interviewed include:

- $4.5 million for a new pulper and feed system with higher-load presses;
- $1.0 million to replace a turbine; and
- $750,000 for sludge dewatering equipment.

One company indicated that remaining competitive requires an annual investment of at least $100,000 in operating improvements alone. In addition, extensive annual capital outlays are required to meet safety and environmental regulations.

2.2 Pulp and Paper Manufacturing is Energy Intensive

Paper manufacturing ranks fifth in energy use among all manufacturing sectors.[6] One Massachusetts paper manufacturer said that energy costs represent 8 percent of its total manufacturing costs. The energy costs of companies interviewed that reported this information ranged from $100 to $167 per ton of product. One paper manufacturer reported spending $4.7 million per year on energy.

Massachusetts ranks sixth in energy costs, placing Massachusetts companies at a disadvantage in competing with companies from other states. Figure 4 on the next page, provided by the state Division of Energy Resources, shows Massachusetts' overall electricity costs were 41 percent above the national average as of 1992. Since 1970 the state's electricity costs have been between 34 and 59 percent above the national average (excluding the oil crisis years of 1974 - 1977, when energy was very expensive, and the relatively lower cost years of 1985-1989 when there was a significant drop in overseas oil prices).

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[5] Miller Freeman Inc.: *Pulp & Paper Project Report Mill-by-Mill Listings of Capital Spending Programs by Pulp and Paper Mills In the United States and Canada in 1994 and Planned for Completion in 1995 and Later*; 1995.

[6] C. Comeau, M. Mullaney, and M. Rapp: "The Paper Industry in Western Massachusetts;" December 18, 1991.

One company interviewed reported paying energy costs of $20 per ton of product in Florida, as compared to $100 per ton in Massachusetts. Another mill indicated spending $500,000 on energy per year in Massachusetts and only $150,000 in Pennsylvania and Ohio.

Figure 4: Massachusetts Electric Rates Percentage Above National Average, 1970-1994

Source: Compiled from Energy Information Administration data.

To help offset higher energy costs, investor-owned utilities (both gas and electric) and quasi-public state agencies have created program initiatives that may help Massachusetts-based companies improve their energy efficiency. These programs view energy efficiency as an important means of increasing the competitiveness of Massachusetts manufacturers and other energy-intensive businesses. They provide opportunities to reduce energy and operating costs by upgrading or improving old equipment. Utilities have developed demand-side management (DSM) programs aimed at:

- Promoting energy efficiency for their customers, and
- Finding other resources that may offset the need for additional power plants (which would raise the cost of electricity and increase dependency on fossil fuels such as coal and oil).

Other programs to assist companies with energy-related projects are offered by the Massachusetts Division of Energy Resources (DOER), Massachusetts Industrial Finance Agency (MIFA), the Office of Technical Assistance (OTA), and the ISP. Through its Energy Advisor Service (EAS), DOER provides technical assistance to help companies identify energy-saving opportunities and recommends cost-effective methods for improving energy efficiency. MIFA (now part of the Massachusetts Development Finance Agency) provides various forms of financing for manufacturing companies; funding is available for

recycling, energy, and environmental projects. The OTA provides companies with technical assistance on various environmental and toxic-use-reduction projects. The ISP provides business consulting, training services, and financing for Massachusetts manufacturers, including companies that undertake energy efficiency or environmental-improvement projects.

Other collaborative programs are available to assist companies with their energy and environmental needs. They include joint program efforts of other non-profit or public-purpose organizations and joint program efforts of local utilities and municipalities. Some of these programs and their broader service offerings are listed in Section 4.2 of this report.

Some of the manufacturers interviewed have already taken advantage of existing energy assistance programs. One company recently negotiated a rate reduction, which translates to annual savings of $40,000 to $50,000.

The state Department of Public Utilities has proposed requiring electric utilities to outline a process for opening the retail electricity market to competition. In theory, this would allow any industrial, commercial, or residential user of electricity to choose their electric company. More information on the proposed restructuring of the electric industry is provided in Appendix D.

2.3 Massachusetts has a Well-Developed Manufacturing Infrastructure

Massachusetts' manufacturers have been producing paper since the early 1800's, and many are using old paper-making equipment. Some Massachusetts mills are using paper-making equipment that was built in the 1800's. In some cases, these machines were designed to make an entirely different product.

Over the last 5 years, about 10 mills have shut down or changed hands in Massachusetts, and three of these facilities remain idle. Because paper making is so capital intensive, these vacant mills represent a useful resource, albeit an old one. A company that wishes to expand or begin paper-making operations may choose to take advantage of Massachusetts' existing manufacturing facilities, rather than begin operations in a new location. In addition, such a company could take advantage of the trained labor force in the area, as well as the existing transportation network, water and fiber supplies, and permits.

Most investment in the paper industry involves upgrading existing infrastructure, rather than buying new paper-making equipment. For example, in 1995 more than 100 paper manufacturers nation-wide invested in upgrading or retrofitting equipment, but only a dozen purchased new equipment.[8] Upgrading paper-making equipment is especially important in an area such as Massachusetts, where older paper-making machines are used.

2.4 Massachusetts' Small Pulp and Paper Companies Compete by Servicing Specialized Markets

Over the last 20 years the paper and paperboard industry has been marked by "dramatic consolidation of ownership."[9] However, in an industry which has tended to be dominated by large companies, all of the pulp and paper mills in Massachusetts are small businesses (if considered on a facility

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[7] *1991-1995 Lockwood-Post's Directory of the Pulp, Paper, and Allied Trades*; Miller Freeman, Inc., 1994.

[8] Miller Freeman Inc.: *Pulp & Paper Project Report Mill-by-Mill Listings of Capital Spending Programs by Pulp and Paper Mills In the United States and Canada in 1994 and Planned for Completion in 1995 and Later*; 1995.

[9] *Industry Brief: Paper and Paperboard Mills*; EPRI; p.4

basis, independent of their parent companies).[10] Sixty-seven percent of the pulp and paper mills are privately held, and of these, 42 percent are family-owned businesses. The average pulp and paper mill in Massachusetts employs 118 people, but its out-of-state competitors employ an average of 289 people per mill.[11] Each Massachusetts mill produces an average of 24,000 tons of product per year. (The smallest produces less than 5,000 tons per year.) The industry average is 128,000 tons of product per mill per year.[12]

Most Massachusetts pulp and paper mills compete with the large paper companies by offering a higher-quality product or more responsive, customized service. In some cases, the market niche targeted by a Massachusetts mill is so small that it cannot be serviced economically with the larger, more-productive paper machines used elsewhere. Because Massachusetts' paper machines turn out product in small batches, their owners can service small, more-specialized market niches. They also may be well-suited to capture emerging niche markets for recycled products.

As a major part of their business strategies, Massachusetts' specialty-market-oriented paper manufacturers pursue business that is not economically serviced with high-speed, high-volume machines. This means that a critical element to their success is the ability to understand market needs and rapidly develop new products to meet them.

2.5 Much of the Primary Pulp and Paper Manufacturing Industry is Located in Economic Target Areas

As shown in Figure 2, much of the primary pulp and paper manufacturing industry is located in western Massachusetts towns such as Dalton and Lee. However, the pulp and paper industry is also concentrated in several central Massachusetts communities such as Fitchburg, West Springfield, and Holyoke. A very small number are scattered across eastern Massachusetts.

Although paper mill employees comprise a fairly small portion of the state-wide work force,[13] some local economies depend heavily on the viability of the paper mills. Most of the 38 active pulp and paper mills operating in Massachusetts are in economic target areas, which meet one or more criteria defining economic need and distress. In many cases pulp and paper manufacturers are one of the few local sources of high-paying manufacturing jobs, paying on average wages of approximately $12.50 per hour and salaries of $37,000 per year.

2.6 Massachusetts Produces a Wide Variety of Paper Products

Figure 5 shows the number of Massachusetts mills that manufacture products in these categories:[14]

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[10] Under the Regulatory Flexibility Act (13 CFR 121.601) Pulp, Paper and Paperboard manufacturers are considered small business if they employ less than 750 people.

[11] Department of Commerce Economics and Statistics Administration; *1992 Census of Manufacturers: Industry Series, Pulp, Paper and Board Mills*; p. 26A-7.

[12] *1995 Lockwood-Post's Directory of the Pulp, Paper, and Allied Trades*; Miller Freeman, Inc.; 1994; pp 3 and 11.

[13] Executive Office of Economic Affairs and University of Massachusetts; "A Statewide Strategy for Job Creation and Economic Growth;" May 1993; p. 86.

[14] If a mill produced more than one paper product, it was assigned to the category that reflected most of its product line.

- High-end writing papers;
- Tissue and toweling;
- Corrugating medium;
- Specialty papers;
- Paperboard and specialty board; and
- Pulp.

The high-end writing papers category encompasses high-quality writing paper, which often includes some cotton fiber. Corrugating medium is the fluted material glued between linerboard to give cardboard structural stiffness and rigidity. The specialty papers category is composed of a wide variety of products, including:

- Laminate papers;
- Cigarette filter papers;
- Currency;
- Automotive filter papers; and
- Book cover stock.

The paperboard and specialty board category encompasses a broad range of products including:

- File folders,
- Food packaging,
- Tickets,
- Tube board, and
- Shoe insoles.

Figure 5: Number of Mills by Product Category

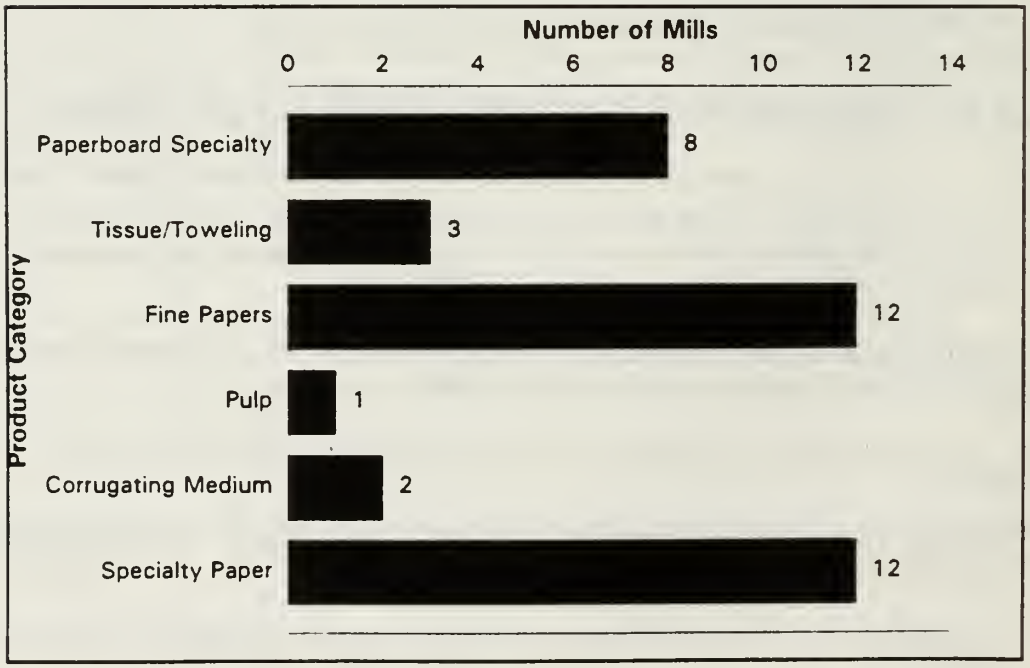

Figure 6 shows the percentage distribution of mills by product category. Most paper mills in Massachusetts produce either high-end writing papers or specialty papers. Approximately 20 percent of the paper companies manufacture paperboard and specialty board products. The manufacturers of tissue and toweling, corrugating medium, and pulp account for less than 20 percent of the state's pulp and paper manufacturers.

Figure 6: Percentage of Mills in Each Product Category

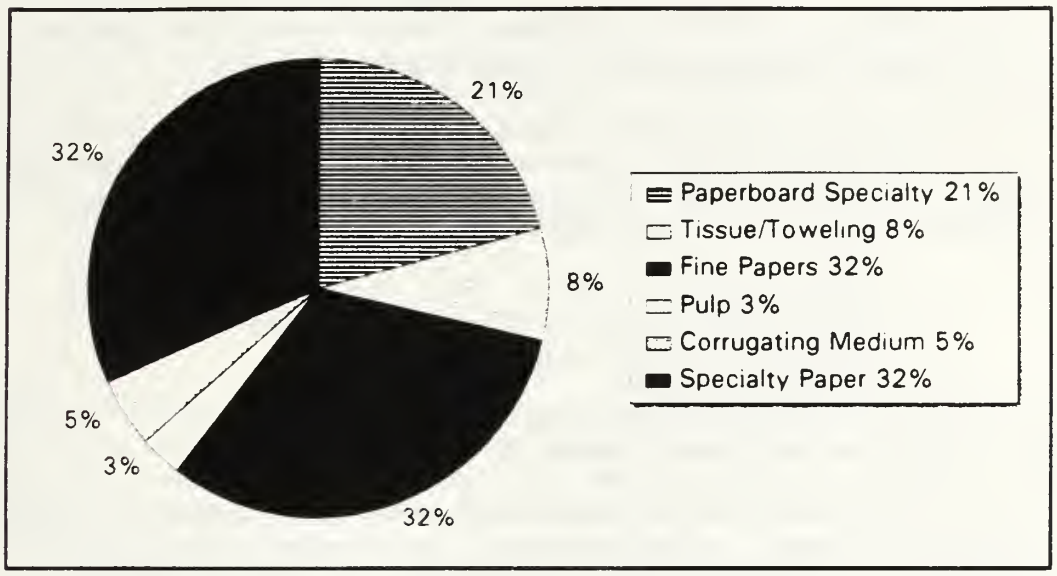

Figure 7 shows the output, in tons, of Massachusetts mills in each product category. Comparing Figure 6 with Figure 7, it is clear that the percentage distribution among product categories is considerably different. For example, the sole pulp mill in Massachusetts generates one-fifth of the state's tonnage. And although almost one-third of the mills produce high-end writing paper, they account for only 12 percent of Massachusetts' output, in tons.

Figure 7: Paper Mill Output as a Percentage of Total Tonnage

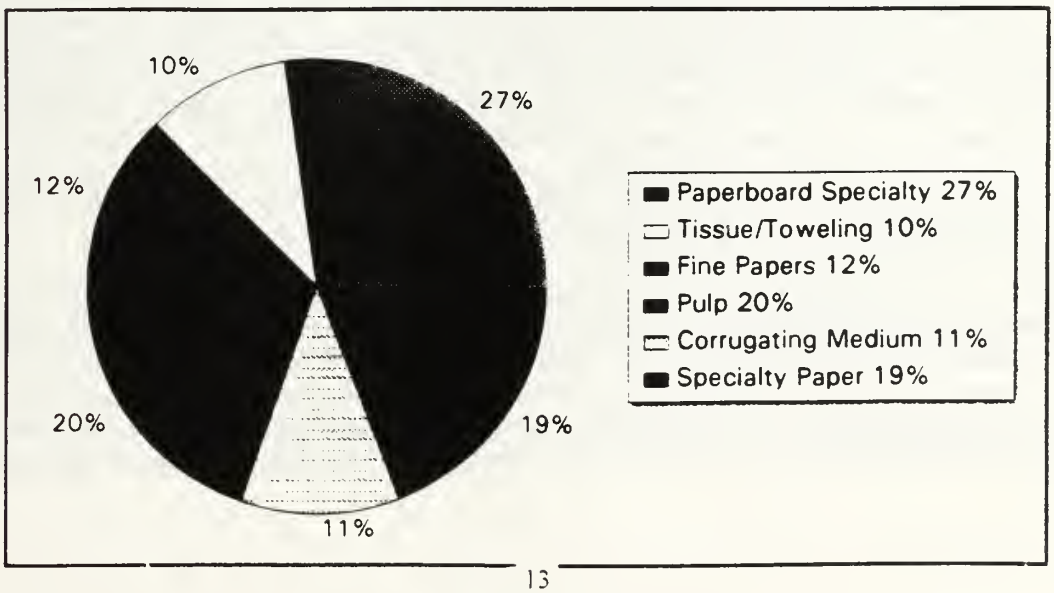

Figure 1 showed which counties produce the most tonnage. Worcester and Hampden counties produce the most product and wastepaper tonnage. In Worcester County (which includes the towns of Fitchburg and Baldwinville), more than 770 people are employed at 6 facilities. The facilities annually produce about 287,000 tons of various paper products and use more than 318,000 tons of wastepaper in making a recycled-paper product. Hampden County is home to 8 mill facilities. The mills employ 923 people to produce more than 183,000 tons of product per year, using more than 161,000 tons of wastepaper in the process. Only five of the 26 companies, representing 11 facilities, employ over 200 people.

2.7 Massachusetts' Pulp and Paper Manufacturers Must Compete with Primary Manufacturers in Other States

Massachusetts offers advantages and disadvantages to pulp and paper manufacturers. All Massachusetts pulp and paper mills compete by targeting specialized product niches, and many also rely on higher product quality and service. According to state and private-industry experts, Massachusetts pulp and paper manufacturers have several competitive strengths, including:

- A skilled workforce,
- A core competency (knowledge of some aspect of the market place),
- Unique technology (process or product),
- An existing infrastructure,
- The capability to service specialized market niches, and
- Extensive educational resources.

In addition, Massachusetts's recycled-paper manufacturers are located near densely populated areas, which are a source of wastepaper. One paper manufacturer recently decided to locate in Massachusetts to take advantage of the existing paper manufacturing infrastructure and the skilled workforce.

Case Study: Tulip Paper Company

In October of 1994, a potential investor in the Tulip Paper Company visited the operator of a paper mill in Canada which made corrugating medium. He learned that sales of corrugated medium were projected to be good for a few more years, and believed that a window of opportunity was open.

Market research was initiated to identify closed mills, equipped with machinery, in the United States that could be acquired and adapted to produce the grade of paper needed for corrugating medium. Closed or abandoned mills were located in California, Pennsylvania and in Holyoke, Massachusetts. The owner of the Holyoke mill wanted to negotiate the best deal possible; the investors were encouraged because the other mills were larger and their refurbishing would be more expensive. The region's supply of wastepaper and relatively favorable energy costs (California, Massachusetts, and Pennsylvania ranked 6th, 7th and 13th in the nation, respectively, in 1992 with the highest electricity costs) also weighed heavily in the investors' decision to locate in Massachusetts, rather than California or Pennsylvania. The building lease and equipment purchase arrangement they negotiated made the investment viable.

Tulip Paper Company was established in March of 1995, employing a crew of about 16 people to prepare the mill for start-up. Unforeseen problems refurbishing the old paper machinery have delayed considerably the mill's return to full operation. The facility was in poorer condition than originally thought, and some of the equipment was unsuitable for adaptation to making the grade of paper required for corrugated medium. Thus, replacing and modifying the machinery and support systems has required more capital than originally anticipated. And, although there were many skilled paper mill workers

available in the area, it has been difficult to find production and engineering personnel with both managerial ability and experience in producing this grade of paper.

When this report was written, Tulip Paper Company had been approved by the Economic Stabilization Trust (administered by the ISP) for a $260,000 term loan, a $35,000 term loan from the Holyoke Regional Business Development Corporation, and equity financing from a New England engineering firm. The funds will be used to bring the plant into around-the-clock operation 5 days a week. At full operation, the mill is expected to employ between 45 and 60 workers and produce more than 75 tons of corrugated medium per day.

Competitive Disadvantages

The story of Tulip Paper Company illustrates some of the advantages of doing business in Massachusetts. However, pulp and paper manufacturers interviewed for the ISP-DEP study also identified several disadvantages of doing business here. They include the relatively high cost of:

- Energy;
- Compliance with environmental regulations;
- Health care;
- Unemployment insurance;
- Workers' compensation; and
- Taxes.

Several pulp and paper companies with manufacturing facilities in Massachusetts and in other states were willing to make the inevitable investments required to continue operating at current production levels, but they expressed reluctance to invest in expansion of their Massachusetts facilities. Companies with facilities located solely in Massachusetts were more willing to consider expanding their operations.

Massachusetts policy makers have acknowledged these competitive disadvantages,[15] and they have made some progress in reforming state statutes and regulations to address them. First, as stated previously, several paper manufacturers have already taken advantage of public/private energy assistance programs. In addition, the State has promulgated several other statutory and regulatory reforms to make, health care and worker's compensation, and unemployment insurance costs more competitive with other states.

Most of the paper manufacturers also felt that the Commonwealth of Massachusetts, and in some cases local government, is not "friendly" to businesses. They believed that Massachusetts regulations are stricter than those of other states, resulting in increased operating and labor costs. For example, one company hires one person exclusively to address environmental reporting requirements. Another company noted that the cost of complying with regulations is continually increasing. Four years ago this company devoted 10 to 15 days per year to address environmental compliance; this year the company required three-quarters of a person-year to meet regulatory requirements.

Massachusetts is streamlining its environmental regulations as well as integrating and speeding up the permitting process. In addition, Massachusetts is implementing comprehensive regulatory reform that involves a new regulatory approach which is outcome- and performance-based. Under this new system, the regulations specify standards to be met, but do not dictate how companies must meet them. In addition to giving companies more flexibility in meeting environmental standards, the regulatory streamlining may actually reduce the number of permits needed. For example, companies that discharge industrial

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[15] Executive Office of Economic Affairs and University of Massachusetts; "A Statewide Strategy for Job Creation and Economic Growth;" May 1993; p. 37.

wastewater to Massachusetts Water Resources Authority (MWRA) sewers are now issued one permit rather than permits from both the MWRA and the DEP.

Many companies felt that the state government tends to adopt an adversarial attitude in implementing regulations, rather than work with industry to resolve problems. At the local level, a couple of interviewees encountered what they perceived to be an "anti-development" attitude. Local officials appeared to focus on the negative effects of a mill, rather than on the contributions it would make to the local tax base and employment picture.

Finally, paper mills tended to feel that Massachusetts offers less help to business than do other states. However, these companies were largely unaware of Massachusetts' business-assistance programs. When a company had taken advantage of such state resources, it either had learned of the program through a social connection, or had been contacted directly by the Commonwealth because of a high-visibility project. Most individuals who tried to take advantage of various state resources found the process frustrating, time consuming, and largely unsatisfactory.

Massachusetts is working to streamline the economic development process through greater use of regional offices. These offices are located in the Western, Northeastern, Central, Southeastern and Boston regions to provide state-wide services and specialized, industry-specific assistance. At the same time, state agencies such as DEP are locating personnel at these locations to help bring the concept of "one-stop" shopping for state services closer to businesses.

3.0 USE OF RECOVERED PAPER BY PRIMARY PULP AND PAPER MANUFACTURERS

Wastepaper is one of Massachusetts' largest exports. Massachusetts annually generates 2.6 million tons of it. Approximately 840,000 tons are recycled annually in the state. Massachusetts pulp and paper mills use over 800,000 tons[16] of recovered material per year, obtained primarily through brokers whose supply comes from throughout the Northeast. Of the 38 establishments that produce pulp or paper, 30 use at least some recovered material.

Recycled fiber is used by:

- **Integrated** mills, which have their own pulpers, and
- **Nonintegrated** mills, which must buy pulp on the open market.

Integrated mills that manufacture recycled-paper products can often buy recovered paper and pulp it themselves. Nonintegrated mills can manufacture recycled products by buying deinked pulp. Until recently there were no Massachusetts manufacturers of deinked pulp. However, Massachusetts Recycling Associates is constructing a deinking facility on the site of a former paper mill in Fitchburg.

Figure 8 shows the percentage of recovered paper, by weight, used in each product category. The Fitchburg deinking facility projects that it will process up to 31 percent of all recovered paper used by primary manufacturers. The paperboard specialty category is also a large user of recovered paper, accounting for over one-quarter of the recovered paper used to manufacture recycled-paper products.

For this report, companies have been categorized by the level of waste paper used:

- Recovered fiber only,
- Some recovered fiber, or
- No recovered fiber.

Figures 9 and 10 show the number and percentage, respectively, of mills in each category.

DEP's interest in the use of recovered paper by Massachusetts' paper industry is closely related to the Commonwealth's ambitious recycling goals. The goal of developing a recycling market is to maximize the use of recovered materials as feedstock for manufacturing. When recyclable materials are used in this manner, the resource-conservation and economic-development benefits of recycling are maximized.

The use of recovered materials in local manufacturing also helps buffer local recycling programs from the dramatic price swings common to export-based commodity markets. Paper mills and local recycling programs would seem to have divergent interests in wastepaper prices. (In the short run, high prices help the economics of local recycling programs but hurt the economics of manufacturing paper, and vice-versa.) Both actually have the most to gain from more-stable markets, which better allow them to count on a reasonable return from their investments in paper-making and recycling infrastructure.

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[16] Recycled tonnage figures include recycled cotton fiber.

Figure 8: Percentage of Recovered Paper Used by Product Category

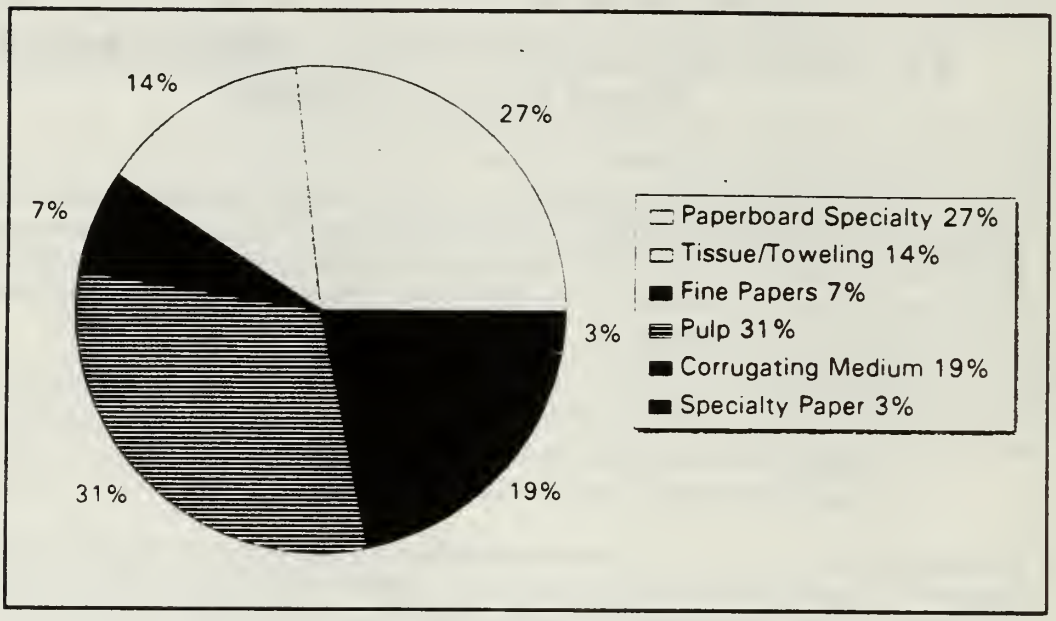


Figure 9: Number of Mills Using Recovered Fiber

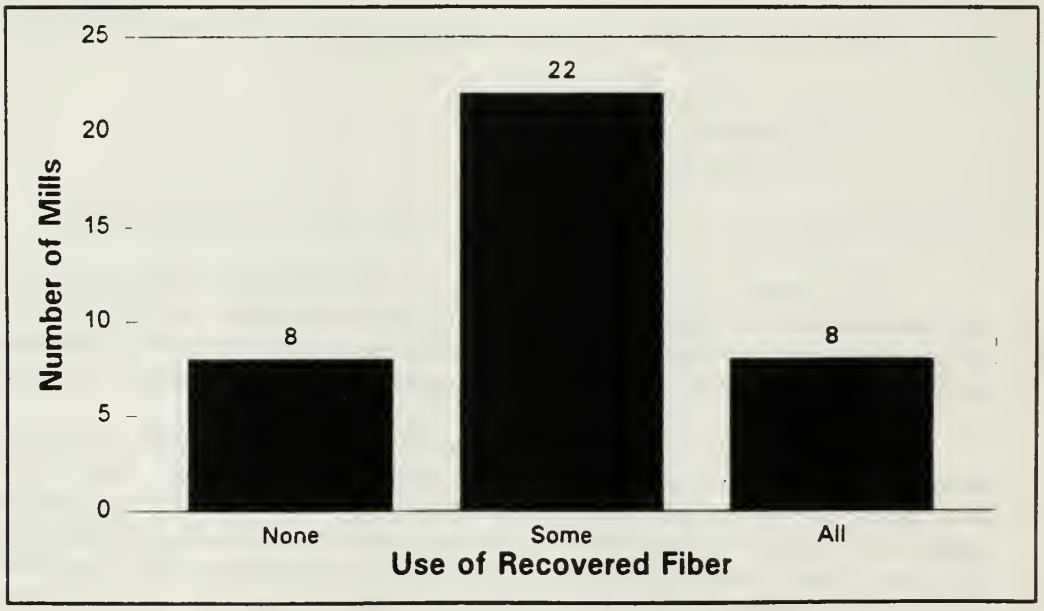
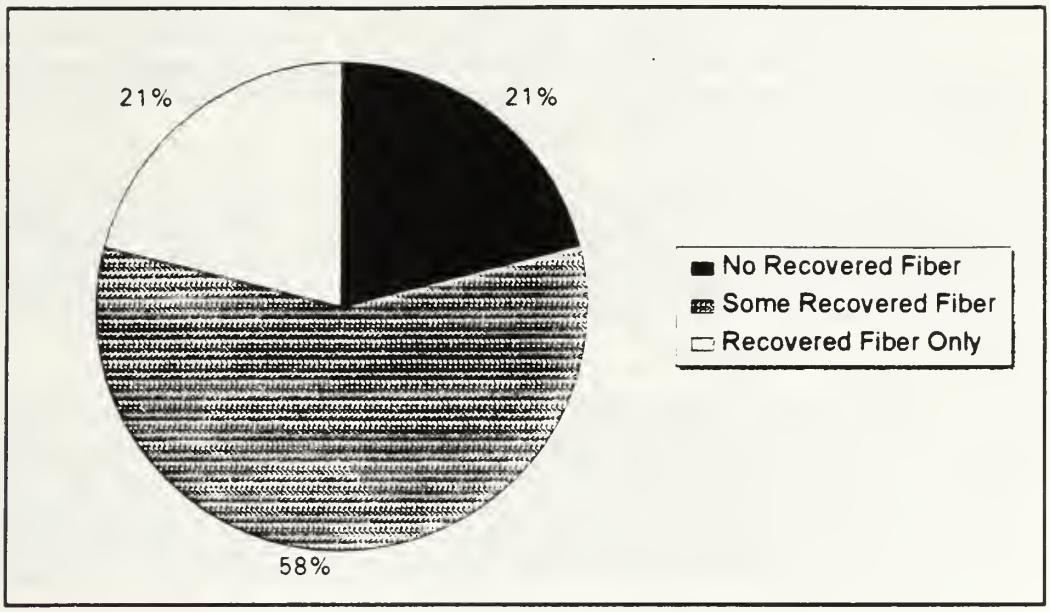


Figure 10: Percentage of Mills Using Recovered Fiber



3.1 Common Issues Affecting Use of Waste Paper by the Paper Industry

All primary pulp and paper mills that produce recycled paper products are affected by the quality, cost, and availability of recovered fiber, and by the demand for recycled products. These four issues are explained below.

Quality

Recycled fiber comes in a wide range of types or categories; the Institute of Scrap Recycling Industries lists more than 37 categories of recycled or "secondary" fiber specifications. This report describes the larger categories primarily used by Massachusetts manufacturers, focusing on two aspects of quality:

- The grade or type of recycled fiber; and
- How well the grade meets the quality specifications of the consuming mill.

In general, the more closely a recycled or secondary fiber resembles virgin fiber, the more valuable it is. Therefore, in examining the general quality of a particular grade, all recycled or secondary fiber should be compared to virgin fiber, which comes directly from hardwood or softwood trees. Chemically pulped, bleached virgin fiber is strong, clean, and white/bright. It readily produces many of the formation properties (such as strength, smoothness, and opacity, or lack of "show-through") that paper manufacturers seek. Much of the paper-making equipment used in Massachusetts was originally designed for virgin fiber.

The secondary fiber that most closely approximates virgin fiber is known as "broke." Broke is the waste created in the manufacturing and converting processes. Reused broke created during the papermaking process is not considered recycled. The industry already maximizes the capture and reuse of broke because it provides major cost savings. However, since broke has been processed once, the strength of its fibers has been degraded, chemicals have been added to it, and it may be contaminated with dirt. On

the other hand, its history is known to the company that will use it, the chemicals are compatible with the process to which it is being returned, and the dirt can be removed by existing process cleaning systems.

Deinked fiber is the next-highest quality source of fiber. It can be used by nonintegrated mills. Through chemical and mechanical means, a deinking mill removes the inks and other contaminants from various grades of pre- and post-consumer wastepaper. The process produces a pulp that is similar in brightness, whiteness, and cleanliness to bleached virgin fiber.

Because a mix of waste is used, the deinking mill must be relied on to accurately identify the pH (acidity or alkalinity) and type of fiber (hardwood, softwood, pre- or post-consumer recovered paper) in the final pulp product. The processing yields fiber which is shorter than the original virgin fiber. This fact can lead to strength and opacity degradation, as well as to lower fiber retention rates (the amount of fiber which remains in the sheet as it is being formed) during the papermaking process. Therefore, the use of deinked fiber can increase processing costs.

Integrated paper manufacturers that have pulping or stock-preparation equipment are sometimes able to directly use other grades of waste paper. For these manufacturers, the next-highest-quality secondary-fiber source is pre- and post-consumer waste that is free of ink and contaminants. This category includes separated office waste, for use by manufacturers of white-paper products, and corrugating cardboard, for use by manufacturers of unbleached board products. Closely related, and slightly lower on the value-scale, is mixed office waste; the next lower tier is mixed residential waste (white paper and brown board).

Newsprint is one of the lowest grades of wastepaper available. The pulping process used to produce the fiber for newsprint is mechanical rather than chemical. This results in less-expensive fiber, but the fiber is also much weaker and dirtier. Newsprint can be used directly only by manufacturers whose end-products (such as newspapers) can mask the dirt. A corrugating medium manufacturer, for example, also can use this type of low-quality fiber for a product that would be inserted between two sheets of linerboard to produce a carton.

These separated and mixed wastepaper categories have specifications for the amount of allowable contamination (such as metal staples, food waste, and dirt) and types of materials (such as envelope windows, laser computer paper, and waxed cardboard) not allowed in the mix. The biggest quality issues associated with these grades at the time of the manufacturer interviews resulted from the very tight market for waste paper. Waste collectors and processors were speeding up collection and processing, resulting in inadequate removal of the contaminants listed above. This situation may improve as the secondary fiber market matures and new competitors emerge to meet increasing market demands.

The Commonwealth has sponsored several initiatives, which may also improve the overall quality of recovered paper in the long-term:

- Massachusetts' first multi-material recycling facility (MRF), in Springfield, was funded by DEP. The facility sorts, cleans ,and separates recycled materials. At least four other privately funded MRF's have opened in Massachusetts. Their operation ensures a more reliable, more highly sorted flow of recyclable materials.

- In October 1995, DEP co-sponsored a workshop introducing the state's recycling industry to the Chicago Board of Trade Recyclables Exchange. This centralized marketplace for recyclable materials, with its optional trade recording and dispute resolution mechanisms, could lead to more-standardized, and more widely used, specifications for recyclable materials, including paper.

- The Executive Office of Environmental Affairs and DEP undertook a direct mail public education program addressing the need for quality wastepaper. This program informs

residents about the types of paper that may be recycled and how the wastepaper should be prepared. These direct mail grants are available to all municipalities in the Commonwealth where mail is distributed to all households.

Cost of Recovered Fiber

Fiber markets are, by nature, cyclical; the primary driver is demand. Domestic and global economic growth directly affect demand. When economic conditions are favorable, demand for finished products—and the cost of raw materials— increases. The recent economic recovery coupled with significant new investments in deinking systems, estimated to reach $10 billion by the end of the decade,[17] caused unprecedented volatility in the fiber markets during the last two years. The cause of this volatility was the level of new investment coinciding with the economic recovery.[18]

Over the last two years demand for all categories of recycled fiber has increased dramatically, partly due to federal and state initiatives to procure recycled products. In the short-term, Massachusetts paper mills did not benefit directly from these increases in demand for recycled products. Although the Commonwealth purchases some of the types of products generated by Massachusetts manufacturers (such as tickets, text and cover stock, and higher end paper such as that used for letterhead) most state-purchased paper products, such as reprographic paper, are not manufactured in Massachusetts. In addition, Massachusetts' primary pulp and paper manufacturers are generally not big enough to service this market.

Massachusetts companies that use recovered paper in manufacturing processes have had to pay much higher prices for recycled fiber. In most cases, they have been unable to pass those increased costs to their customers. In the 12 months ending in November 1995, the price of recovered fiber rose by 43 percent across all waste paper categories. When the manufacturers were interviewed, the average price of wastepaper was considerably higher.[19] Although wastepaper prices continue to drop, the inability to predict price fluctuations complicates strategic planning for investments involving recycled fiber.

Supply/Availability

Manufacturers of some types of products are less affected by changes in the supply or availability of recovered fiber because of their:

- Ability to pay for fiber; or
- Ability to substitute one type of fiber for another.[20]

For example, because of the higher value of their end-product, manufacturers of high-end writing paper are more able to pay higher fiber prices than are tissue and towel manufacturers. On the other hand, towel and tissue manufacturers are better able to substitute a lower grade of fiber because their performance specifications are lower. Both types of manufacturer are better off than manufacturers of corrugating medium, which have a similar substitution ability but a lower ability to pay.

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[17] American Forest & Paper Association, *Recovered Paper Deinking Facilities*; September 1995; p. 1.

[18] Michael Alexander; "The Restructuring of the Waste Paper Market;" *Waste Age*; 1995.

[19] *Paper Recycler*. These prices are for the New York City area.

[20] Technical discussion with Jaakko Poyry, November 21, 1995.

When the interviews were conducted, all manufacturers could obtain recycled fiber as long as they were willing to pay the increased cost and deal with an overall decline in fiber quality. However, once the new deinked pulp facility in Massachusetts comes up to production speed, it should significantly increase the demand for some grades of recycled fiber. Therefore, manufacturers are concerned about long-term availability. In addition unless new sources of waste paper are found, price pressure on recycled fiber will likely continue to increase.

This price pressure may continue to have a domino effect on the availability of all grades of recycled fiber. As high-end fiber becomes costlier, more companies may explore investing in technologies to use lower-grade recycled fiber. In the worst case, as lower grade fiber becomes scarce, small users in Massachusetts may be edged out by larger mills in Massachusetts and in other states. On the other hand, as investments are made in technologies for using lower-grade fiber, availability may improve because a broader range of low-end fiber can be accepted.

The Commonwealth recognizes the importance of ensuring that paper and pulp mills have a steady supply of waste paper. EOEA and DEP have worked to increase this supply by motivating state-wide access to residential and commercial recycling programs and by promoting full participation in those programs. The DEP is working on several initiatives to increase secondary fiber supplies:

- Over the past five years, EOEA and DEP have provided assistance to help municipalities increase their residents' access to recycling. Approximately $10 million worth of equipment grants have paid for roll-offs, trucks, and set-out containers. Currently, 97 percent of the residents have at least some access to either a drop-off or a curbside recycling program.

- Extensive public education efforts, including a direct mail program, were also initiated to increase participation in recycling. EOEA and DEP are conducting a market research study to investigate the barriers and opportunities to increasing participation. The findings of this study can be used to develop a media campaign focused on encouraging greater participation in residential and commercial recycling programs.

- In 1994, DEP, trade associations, environmental groups, and several leading corporations formed a nonprofit organization, known as WasteCap, to help companies implement effective waste-reduction and recycling programs. In its first year of operation, WasteCap helped more than 750 companies in Massachusetts start or expand their recycling programs. In mid-1995, WasteCap worked with the Building Owners and Managers Association on a contest aimed at increasing office paper recycling in downtown Boston.

- In 1995, DEP created a loan fund aimed at increasing access to financing for firms collecting, processing, or using recyclable materials in manufacturing, including the state's extensive network of wastepaper-recycling firms. This "Recycling Loan Fund" will be capitalized with an additional $1.0 million in 1996.

- DEP's solid waste regulations are aimed at maximizing recycling:

  - Certain categories of wastepaper are banned from disposal at landfills.
  - Recycling processors who qualify are exempt from DEP's solid waste regulations.
  - Paper mill sludge has been approved for use as a landfill cover in the state.

  In December of 1995, DEP announced a two-year moratorium on the permitting of new landfills in Massachusetts and indicated a preference for the recycling of waste materials.

Demand for Recycled Products

During the interviews, the mills indicated that their customers want recycled products only if they are of the same quality, and price, as virgin-fiber products. DEP is working on several initiatives to increase demand for recycled products. First, using staff dedicated to recycled purchasing (funded by DEP), the Department of Procurement and General Services rewrote many of its purchasing specifications. This resulted in sizable increases in the Commonwealth's purchasing of products with recycled content, from $2.8 million in 1992 to $17.3 million in 1995. Massachusetts manufacturers generally are not large enough to directly service the Commonwealth. However, this procurement strategy has led to increased demand for some types of recycled products made here, such as tickets, text and cover stock, and high-end writing paper.

In addition to government procurement efforts, DEP has undertaken a number of initiatives to increase purchases of recycled products, including:

- The **Buy Recycled Business Alliance**, which was created in early 1995 to encourage businesses to increase their purchases of recycled products and to provide them with technical assistance. More than 120 businesses have committed to increasing their purchases of recycled products under the program, including such major Massachusetts firms such as Boston Edison, Hyde Manufacturing, NYNEX, and the Berkshire Hilton.

- The **Massachusetts Packaging Challenge**, a voluntary program which recognizes businesses that use post-consumer recycled content in their packaging. In April of 1995 Governor Weld gave annual merit awards to 56 companies for meeting the Challenge.

EOEA and DEP are also working on providing **public service announcements** for municipalities to run on local cable networks. These PSA's highlight the value of recycling to the community. The results of this regional campaign may aid the design of a state-wide publicity program.

3.2 Use of Recovered Paper

While every company is unique in its capabilities and needs, some valid generalizations can be drawn regarding incentives for and barriers to increasing use of waste paper within companies producing similar products or facing similar customer requirements. As stated previously, companies have been categorized in this report by the level of waste paper used:

- Recovered fiber only,
- Some recovered fiber, or
- No recovered fiber.

Mills within each of these categories tend to have different incentives and barriers that affect use of recovered paper.

Users of Recovered Fiber Only

Historically, companies that produce the lower value-added paper products (which do not require expensive bleached fiber or much advanced processing) use the lowest cost fiber available. In Massachusetts, these companies include some paperboard manufacturers, and producers of corrugating medium or tissue and toweling. Initially built to use some recovered fiber, these facilities have been modified over the years and now use only recycled fibers.

Cost is the primary incentive for these companies to use recycled fiber. The low grades of recycled fiber are much less expensive than virgin fiber. The only way to increase the overall use of recycled fiber by this category of manufacturers is to increase their output of product. All of the easy

productivity improvements have been made, however, and additional capacity increases may require large capital outlays.

Another barrier to increased usage is the availability of low-cost fiber. The companies that use recycled fiber exclusively have the lowest profit margins and are least able to pass increased fiber costs to their customers, who can obtain these products from larger competitors. Companies in this category also are most likely to face intense competition for waste fiber from companies that are developing technologies to use lower grades of waste fiber.

A third barrier to increased use is the quality degradation of various categories of secondary fiber. The biggest problem for these manufacturers is contamination. One tissue and toweling producer indicated that contamination in its waste fiber affected the cleanliness of its own end product, and the company has had to explain this to its customers.

The other company in this category is the deinked pulp producer, which uses 100 percent recovered fiber. Again, the incentive for using this material is entirely economic. The major barriers for increased use, again, include access to a supply of reasonably priced waste fiber. If increases in the cost of raw material drives the price of deinked pulp too high, mills that use deinked pulp for feedstock may cut back on their use unless their own customers are demanding recycled products.

Users of Some Recovered Fiber

Manufacturers of high-end printing paper and some specialty paper and paperboard manufacturers are able to use some recycled fiber.

The incentives for paperboard and specialty paper manufacturers to use recycled fiber are largely economic. Secondary fiber is cheaper than virgin fiber. Although secondary fiber is neither as strong nor as clean as virgin fiber, secondary fiber tends to be strong enough and clean enough for the products made by these manufacturers. Investments in this segment of the paper industry may represent the best opportunities for increasing the use of recovered paper.

The disincentives include increasing quality degradation, rising prices of this fiber relative to virgin fiber prices, and the capital investment required to modify processes to use other grades of waste fiber.

For high-end printing paper manufacturers, the situation is different. Their incentives for using waste paper are external, including:

- Customer demand for product with recycled content; and
- A commitment by the paper industry (the American Forest & Products Association) to be environmentally responsible and to increase the total amount of paper recovered for recycling and reuse to 50 percent of the paper used by Americans.

The barriers to the increased use of recycled fiber by this category of manufacturers are also different. During the interviews manufacturers cited a lack of customer demand for recycled products unless they are the same quality as virgin fiber products and no more expensive. To satisfy their customers, these manufacturers must use the highest quality deinked fiber. However, this material is often more expensive than virgin fiber if the costs of additional chemicals and process slow-downs to respond to quality problems associated with deinked fiber are factored in.

The current market volatility and resulting impact on fiber quality have also constituted a major barrier to increased use of recycled fiber by manufacturers that use some secondary fiber. The inability of

paper manufacturers to control the quality of the waste fiber they purchase can be extremely costly. One printing company described an incident in which contamination in the waste paper caused "stickies." "Stickies" is a general term for contamination (such as small pieces of plastic from an envelope window) that is too light to be removed by stock preparation cleaning equipment. The contaminant coats the paper-forming section of the machine, often causing the machine to break down and require a complete cleanup. The contaminant also becomes impregnated in the paper as it is made. Resolving one such incident cost one company $143,000:

- $15,000 for wire replacement costs,
- $8,000 in labor costs, and
- $120,000 of net product lost.

Given the quality levels of recycled fiber in June 1995, when the interviews were conducted, "stickies" and other contamination problems were common. The lack of control of waste fiber pH and the poorer retention of waste fiber were also causing additional environmental treatment costs. Therefore, companies wishing to develop recycled product lines may want to consider investing in equipment that can prevent or resolve these types of problems.

Users of No Recovered Fiber

Companies in this category include some of the manufacturers of specialty paper and board products. Because their customers need products with certain strength, cleanliness, smoothness, absorption ability, porosity, or electrical properties, these manufacturers have not been able to use waste fiber in their product lines. Paper mills in this category are not using recovered fiber because of uncertainties about the quality of deinked or other recovered fiber. Investments in process changes to address quality issues are not economically feasible.

In some cases, the manufacturers have not found affordable technology that would allow them to use recovered fiber and still meet their customers' standard specifications. In other cases, their customers' specifications clearly prohibit the use of waste fiber. (For example, waste fiber is not allowed to be used in products for the automotive industry, some food industry consumers, and computer and medical clean rooms). This situation may change as private and consumer pressure to recycle increases. The auto industry, for example, is rapidly changing its specifications to include recycled material in response to world-wide environmental pressures. Nissan, Ford, Volkswagen, and Toyota, among others, have formal programs to reduce waste, incorporate recycled material, and increase the recycling of all components of used cars.

4.0 RECOMMENDATIONS FOR INCREASING THE COMPETITIVENESS OF MASSACHUSETTS PULP AND PAPER MILLS AND THEIR USE OF RECOVERED PAPER

This report's summary of the competitive and recycling issues facing primary pulp and paper manufacturers is an important step in developing state assistance programs that are more responsive to the needs of the industry. Several ideas on how the Commonwealth could assist the primary pulp and paper manufacturing industry emerged from this study. They are described in this chapter.

4.1 Enhance Communication between the Primary Manufacturers and State Assistance Programs

Ongoing communication between the Commonwealth and the primary pulp and paper manufacturers would be more efficient if it were carried out through an industry network, rather than with each of the state's 38 mills individually. In Western Massachusetts, 5 primary manufacturers, 2 converters, and 1 printer have already formed a network, which is known as the Berkshire Paper Industry Alliance. Network members work together on common issues and have established 3 subcommittees: education, environment, and safety. DEP and the ISP may decide to work with the Bay State Skills Corporation and the Massachusetts Manufacturing Partnership to establish similar regional networks or to encourage the Berkshire Paper Industry Alliance to become a state-wide network.

The ISP will hold a series of focus solutions groups either with industry network(s) or with interested industry representatives to review this report's conclusions and to identify areas for future study or areas where productive action could be taken.

4.2 Improve Accessibility of Existing State Programs

Given Massachusetts pulp and paper manufacturers' general lack of awareness about existing state assistance programs, the Commonwealth clearly has to be more active in providing assistance to its pulp and paper mills. In general, Massachusetts pulp and paper manufacturers are low-margin operations that do not have time to navigate the labyrinth of state bureaucracy. For example, a pulp and paper manufacturer recently moved one of its offices (involving over 100 jobs) to a neighboring state. The company would have preferred to stay in Massachusetts, and was even willing pay a little more to stay here. However, the neighboring state essentially did a better job of "courting" this company. The local economic development agency and even the Governor himself encouraged the company to relocate by identifying and obtaining low-interest loans and energy assistance. The company was apparently unaware that Massachusetts also offers both types of programs.

As discussed in Section 2.7, the pulp and paper mills interviewed felt that Massachusetts offers less help to business than do other states. This perception is due, in part, to the fact that businesses are unaware of Massachusetts' state and private-sector resource programs, which can assist them in areas such as training, financing, marketing, permitting, technology, energy-efficiency, toxic-use-reduction, solid waste management, workforce re-employment, education, business management consulting, exporting, and real estate. These types of assistance are provided by several different state programs, which has made it more difficult for a single business to find its way through the maze of assistance providers. In addition,

criteria used to determine eligibility for some of these services may make them unavailable or nonresponsive to a particular business' needs.

Fortunately, a few agencies and programs can play the part of "state resource ambassador." They are able to broker information on other state resources or private-sector assistance programs that can be tailored to the needs of the paper industry. As one step toward making companies more aware of existing programs, Appendix A lists a few of the primary contacts that may guide businesses to the appropriate sources of state assistance. This list does not identify and summarize all the available state resources, but instead highlights a few programs that offer specialized services which address the needs expressed by paper industry participants in the survey. More detailed information about these programs is being provided to interview participants under separate cover.

The Massachusetts Manufacturing Partnership (MMP) recently began a program to coordinate the types of environmental technical assistance that various state agencies provide. MMP recently formed a partnership between the Massachusetts Department of Environmental Protection, the Office of Technical Assistance for Toxic Use Reduction, and the Toxic Use Reduction Institute, which may help alleviate some problems manufacturers have had in navigating through various state technical-assistance programs.

The focus solutions groups may be able to identify other ways to improve the accessibility of existing state programs. Later this year, with funding provided by DEP, the ISP will offer training to economic development agencies in specific areas of concern, focusing on how to actively address these issues. The focus/solutions groups may also be able to provide useful input on how to structure the training of state economic development agencies to make them more responsive to industry needs.

4.3 Develop Training Programs for Employees of the Pulp and Paper Manufacturers

Training is a central issue to be addressed in focus/solutions group discussions. Most of the companies interviewed for this report identified specific training programs which would increase their competitiveness. Companies generally "peer train" new employees. Depending on who performs the training, new employees often learn the mechanics of what they do rather than how the entire system works. Therefore, employees do not always know how to respond when a treatment system fails, or something unusual occurs.

Certain systems are common to all paper-making operations. For example, all employees should know how a pump works and how to trouble shoot a vacuum system. Training in such areas would be very useful to the industry as a whole. In addition, many companies have trouble finding qualified managers. Some companies felt that basic training in math, language, and computers would also be helpful.

The Berkshire Paper Industry Alliance in collaboration with the Berkshire Plastics Network has already developed a training program, funded by the Bay State Skills Corporation working cooperatively with the Regional Employment Board. This program, which took place at Berkshire Community College, provided industry-specific training, including industry-sponsored field trips to plastics factories and paper mills. Of the 24 people who took the course, 18 found employment in the paper industry. The Commonwealth should continue to encourage and promote these types of collaborative training efforts, which leverage resources from several state and private sources.

4.4 Promote Partnerships between Universities and Companies on Research and Development

According to the interview participants, the pulp and paper industry tends to operate on low margins and low overhead. As a result, these companies do not always have extra personnel resources to

develop new product lines that would enhance their competitiveness or new processes that would decrease their operating costs. The Commonwealth could assist the industry as a whole by promoting partnerships with university research facilities to develop innovative products. To ensure that such arrangements do not give one company a competitive advantage at the expense of another, their results would have to be disseminated universally, and pulp and paper companies would need equal access to this service.

For example, operating out of the University of Massachusetts (UMASS) in Lowell, the Toxic Use Reduction Institute's research and development laboratory focuses on aqueous-based cleaning chemistries. This laboratory is currently examining the "stickies" problem. In addition to ensuring the results of such research are disseminated to primary pulp and paper manufacturers, the Commonwealth may wish to examine whether this laboratory could perform additional research that would benefit the paper industry.

The UMASS Economic Project, the Center for Economic Competitiveness, is interested in studying the Massachusetts paper industry. The focus/solutions group should consider working with UMASS to determine whether there are areas where further analysis is needed beyond the work identified in this study. For example, the paper industry and UMASS might decide to:

- Quantitatively analyze the competitiveness of primary pulp and paper manufacturers,
- Expand the study to include converters and container plants, or
- Analyze the effectiveness of programs assisting the paper industry in other states.

4.5 Provide Technical Assistance in Meeting Regulatory Requirements

Many of the companies interviewed expressed frustration at dealing with the state on environmental and safety issues, either in terms of process or of the time required to understand and comply with regulatory requirements. DEP has undertaken a considerable amount of regulatory reform over the past few years. These efforts include establishing regional service centers to make it easier for firms to find information and adopting fee-based permitting with more-predictable timelines. DEP recently launched a major initiative aimed at maximizing pollution prevention and clean-up, while minimizing the private- and public-sector resources required to achieve them. The initiative includes:

- Streamlining, integrating, and speeding permitting while improving consistency;
- Realigning DEP for increased focus on environmental and human health priorities; and
- Undertaking comprehensive regulatory reform toward approaches that are outcome- and performance-based.

A list of starting points for firms to obtain information from DEP is included in Appendix A.

DEP, OTA, and other state regulatory agencies may want to consider providing industry-specific education and outreach to help the state's paper industry comply with environmental regulations. Paper mills, economic development agencies, and regulatory agencies also may want to explore innovative beneficial uses for paper mill residuals.

4.6 Provide Access to Capital Either Through Grants or Low-Interest or High-Risk Loans

As outlined in Appendix A, there are several state programs in place to help companies obtain financing for capital investments or to reduce capital costs. Some of these programs already are being used by primary manufacturers. The Commonwealth can maximize the use of its capital-assistance programs by being more active in offering them to industry.

Some companies interviewed operate on low profit margins and would not be able to compete without additional investment. Several companies outlined investments which would allow them to hire more people or increase their output. For example, one company needs additional drying equipment, which would allow it to employ 16 more people. Another company indicated that replacement of a turbine would increase production by 20 percent (over 3,000 tons per year) and increase its revenues by $1 million annually. A company that investigated obtaining financial assistance from the state found that several capital-assistance programs focus on job creation, rather than job retention.

Several paper companies have taken advantage of existing capital-assistance programs to make investments that would allow them to use more recycled paper. For example, napkin and tissue paper manufacturer Erving Paper received a grant from the National Industrial Competitiveness through Energy, Environment, and Economics (NICE3) to make capital improvements that will allow it to use 35 - 40 percent more post-consumer waste paper while cutting its fuel use by 1.4 million gallons per year. The process line improvements allowed Erving Paper to increase particle removal with less loss of fiber. The investment of $2.7 million, shared by NICE3, the company, and the Commonwealth, will save the company $742,300 in annual energy and waste disposal costs.[21]

Many of the primary pulp and paper manufacturers interviewed had explored technologies for using lower-grade recycled fiber in existing manufacturing processes. However, these technology changes are costly. For example:

- A corrugating medium manufacturer that uses 100 percent recovered fiber could increase use of the material only if it had access to greater supplies. The company has explored using loose (unbaled) waste material directly from supermarkets, but this would require a minimum investment of $125,000 in material-handling equipment alone, without addressing the new quality issues.

- A specialty paper products manufacturer, which cannot use recycled paper because of customer quality specifications, would have to invest $300,000 for a new stock cleaning system to be able to meet its customer specifications—even if it used the cleanest deinked fiber available.

- Another specialty paper products manufacturer would require chemical treatment of the fiber, at a cost of $40 per ton or $750,000 per year, to move to a lower-grade waste source.

- A high-end writing paper manufacturer could increase its use of recycled paper only if doing do would not change the overall quality of the end product. To achieve this, the company would have to invest $1.5 million to $2.0 million in cleaning, screening, and storage equipment and space.

The Commonwealth has several programs which provide financial assistance to companies contemplating such investments. These financing programs are intended to fill the gap where conventional bank financing or private investments are either insufficient or unavailable to implement a capital improvement project or install new process equipment or support systems. Often times, financing gaps exist due to line of credit limitations with the company's bank, financial situations or non-tangible or under collateralized projects that may make a lendor feel over exposed or at high risk to finance a particular project (See Appendix A).

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[21] NICE3: *Partical Analyzer, Nontoxic Chemicals Boost Paper Recycling*; September 1994.

4.7 Assist Companies in Reducing Energy Costs

Government and private industry can help the pulp and paper manufacturers substantially reduce operating costs by improving access to state energy-assistance and utility-run programs. Existing state energy-assistance programs are described in Appendix A.

Technical assistance and information is available through local investor-owned utilities (gas and electric), with each utility offering its own initiatives for energy-related business services in each of their respective service territories. In addition, technical assistance is available for eligible Massachusetts companies in areas where utility-assistance programs are unavailable, or limited, through the Energy Advisor Program (EAS). Another support program for energy efficiency and pollution prevention is provided by the Business for Social Responsibility (BSR), which offers assistance in partnership with the U.S. Environmental Protection Agency's and the Department of Energy's Climate Wise Program.

4.8 Increase Supply of Recovered Paper

The Commonwealth will need to continue its efforts to increase collection of wastepaper. Increasing the wastepaper supply would help reduce wastepaper costs and address availability concerns.

At the local or regional level, economic development agencies may wish to try acting as a catalyst in connecting primary manufacturers with local wastepaper sources (such as municipalities). For example, New York State worked with municipal suppliers in Madison County and a cellulose insulation manufacturer to develop supplies of clay-coated newsback for testing in manufacturing operations. This type of matchmaking could be feasible for the smaller companies in Massachusetts that have a manageable fiber appetite.

4.9 Increase Demand for Recycled Products

Interviewees observed that the recent increase in demand for recycled products has been mostly for low-end, high-volume reprographic paper, which is not manufactured in Massachusetts. The manufacturers of the high-end specialty writing paper, specialty papers, and paperboard specialty products cited their customers' lack of demand for recycled products, unless they could be provided with "the same quality at the same price" as the nonrecycled products. Manufacturers suggested that the Commonwealth stimulate demand for recycled products by increasing public awareness of recycling's benefits and by encouraging acceptance of products that may look a little different from products made with only virgin fiber. Once its awareness is increased, the public may be more willing to pay higher prices.

The Commonwealth has had some success in increasing consumer acceptance of recycled paper. For example, 120 companies have committed to the Buy Recycled Business Alliance to increase purchases of recycled products.

5.0 NEXT STEPS

This study is an important step in making state assistance programs more responsive to the primary pulp and paper manufacturer's needs. This chapter provides a brief summary of the conclusions of this study, which

- Characterizes common issues that affect the economic viability of the industry; and
- Identifies alternatives for assisting the industry and increasing its use of recovered paper in the manufacturing process

5.1 Opportunities for Increasing Competitiveness

The ISP will assemble a focus solutions group to review the report and identify ways of moving forward in assisting primary pulp and paper manufacturers. The group may decide to:

- Establish one or a series of industry network(s).
- Expand existing networks.
- Develop a curriculum for training the state's economic development community in how best to assist the paper industry, or
- Work with universities, Bay State Skills Corporation, or other state and local groups to develop employee training or research and development programs that are responsive to the needs of the paper industry.

Having examined the issues and problems faced by primary pulp and paper manufacturers in this report, the ISP and DEP hope to provide training to make state capital- and technical-assistance programs more accessible and responsive to the needs of the industry.

5.2 Opportunities for Increasing Use of Recovered Paper by Primary Pulp and Paper Manufacturers

The primary issues that affect the use of recovered paper by primary pulp and paper manufacturers in Massachusetts are:

- Secondary fiber quality;
- Cost of secondary fiber;
- Supply/availability of secondary fiber; and
- Demand for recycled products.

DEP is addressing these issues and will expand initiatives in these areas as opportunities arise. In some cases, state capital-assistance programs could improve the competitiveness of manufacturers and

increase their use of recovered paper by stimulating investment in technologies that decrease the cost of using secondary fiber by

- Allowing manufacturers to use lower-grade fiber, and
- Addressing fiber-quality issues.

The Commonwealth of Massachusetts may wish to study the costs of these kinds of investments and investigate their potential benefits in reduced operating costs or increased use of recycled materials

5.3 For More Information

More information about this study is available from:

Sarah Dagher
Manager, Technology Division
Industrial Services Program
(617) 727-8158 x 381

Jeffrey Lissack
Director, Recycling Market Development
Department of Environmental Protection
(617) 292-5583

Greg Cooper
Recycling Specialist
Department of Environmental Protection
(617) 292-5988

APPENDIX A
State Programs Relevant to the Needs of the Paper Industry

Bay State Skills Corporation (BSSC)

101 Summer Street
Boston, MA 02110
Phone: (617) 292-5100
Fax: (617) 292-5105
Contact: Jack McCann

Bay State Skills Corporation creates and supports programs to: upgrade worker skills, with a focus on emerging technology-based industries; assist firms in the areas of manufacturing modernization, high-performance work organization, technology improvements, and workforce development, and enhance K-12 education

Programs are often designed in partnership with trade associations or networks of companies. Usually requires a private sector match (cash or in-kind) equal to 20-50 percent

Chelsea Center for Materials Reuse

180 Second Street
Chelsea, MA 02150
Phone: (617) 887-2300
Fax: (617) 887-0399
Contact: Amy Perlmutter

The Chelsea Center for Materials Reuse was created in February, 1995 for the purpose of creating jobs, supporting recycling efforts, and helping the economy and the environment by working to increase the use of recyclable materials in manufacturing processes. The Center will provide technical support and information to individuals, organizations and businesses interested in implementing wider use of recyclables in manufacturing

The Department of Environmental Protection (DEP)

Division of Solid Waste Management
One Winter Street, 4th Floor
Boston, MA 02108
Phone: (617) 292-5500
Fax: (617) 556-1049
Contact: Jeffrey Lissack (*for information on the paper industry or recycling programs*)
Greg Cooper

For permitting and information on regulations contact a Regional Service Center

Western Massachusetts	Central Massachusetts
436 Dwight Street	75 Grove Street
Springfield	Worcester
(413) 784-1100 ext. 214	(508) 792-7683

Southeastern Massachusetts,
Cape Cod and Islands
20 Riverside Drive
Lakeville
(508) 946-2714

Metropolitan Boston and
Northeastern Massachusetts
10 Commerce Way
Woburn
(617) 932-7677

The Department of Environmental Protection was established in 1975 as part of a reorganization of state government and in response to growing public awareness about the need for environmental protection. DEP is responsible for ensuring clean air and water, the safe management of solid and hazardous wastes, the timely cleanup of hazardous waste sites and spills, and the preservation of wetlands and coastal resources.

DEP has established various waste reduction, recycling, permitting, research, compliance and enforcement program initiatives to ensure a clean and safe environment, providing citizens, municipalities, and regulated businesses with the information and assistance they need.

Energy Advisor Service (EAS), Division of Energy Resources (DOER)

Energy Advisor Service
100 Cambridge Street, Room 1500
Boston, MA 02202
Phone: (617) 727-4732
Fax: (617) 727-0030
Contact: Cliff Sullivan

The Massachusetts Division of Energy Resources (DOER), through its Energy Advisor Service (EAS), provides the technical assistance companies need to cut energy costs. EAS utilizes engineers from the private sector who provide flexible and comprehensive energy efficiency analyses of manufacturing processes and facilities. The service is customized to meet the needs of individual companies. EAS engineers identify energy saving opportunities and recommend cost-effective methods for achieving energy efficiency.

The Industrial Services Program (ISP)

The Schrafft Center
529 Main Street, Suite 400
Boston, MA 01291
Phone: (617) 727-8158
Fax: (617) 242-3072
Contact: Sarah Dagher

The Industrial Services Program is a quasi-public agency dedicated to improving the competitiveness and financial success of Massachusetts-based companies and their workers. ISP's mission is to provide reemployment, financial, training, and business services to companies, industries, and workers to help them meet the challenge of major economic and technological change.

Services to companies include financing assistance and customized management counseling in the areas of financial restructuring, energy efficiency, environmentally sound operations, marketing strategy, and workforce development and training.

Massachusetts Business Development Corporation (MBDC)

One Liberty Square
Boston, MA 02116
Phone: (617) 350-88[illegible]
Fax: (617) 350-0052
Contact: Carol Flen

The Massachusetts Business Development Corporation is a private corporation under state charter which provides loans to private and non-profit firms unable to obtain full financing from conventional lenders. MBDC provides loans for working capital, fixed assets, or business acquisitions and expansions. Their funding range averages between $250,000 and $1.5 million. MBDC is the fund manager for the Department of Environmental Protection's Recycling Revolving Loan Fund, which provides loans to small recycling-related businesses to help leverage other financing.

Massachusetts Industrial Finance Agency (MIFA)

75 Federal Street
Boston, MA 02110
Phone: (617) 451-24[illegible]
Fax: (617) 451-3835
Contact: Bonnie Sullivan

The Massachusetts Industrial Finance Agency is an independent public agency created to promote economic growth and increase employment through a variety of financing incentives. MIFA provides capital to growing enterprises to finance purchases of equipment, land, or facilities; construction, renovation, or expansion of facilities, or to refinance asset-based debt. MIFA issues both tax-exempt and taxable bonds, insures loans, and makes direct loans for asset-based industrial expansion and commercial development.

Massachusetts Manufacturing Partnership (MMP)

Bay State Skills Corporation
100 Summer Street, Fourth Floor
Boston, MA 02110
Phone: (617) 292-5100
Fax: (617) 292-5105
Contact: Ms. Jan Pounds, MMP Managing Director

(Regional offices located in Boston, Dartmouth, Lowell, Holden, and Springfield)

Greater Boston Manufacturing Partnership
College of Management
University of Massachusetts at Boston
100 Morrissey Boulevard
Boston
(617) 287-7698

Merrimack Valley Manufacturing Partnership
175 Cabot Street, Room 307
Wannalancit Mills
Lowell

Southeast Massachusetts Mfg. Partnership
Southeastern MA Development Ctr.
University of Massachusetts at Dartmouth
128 Chase Road
Dartmouth
(508) 997-3385

Central Massachusetts Mfg. Partnership
30 Shrewbury Street
Holden
(508) 829-0300

(508) 459-6867

Manufacturing Partnership Western Mass
139 Marston Hall
University of Massachusetts at Amherst
(413) 637-3200

The Massachusetts Manufacturing Partnership provides high-quality technical, management, and support resources geared to helping manufacturers in manufacturing, productivity, quality improvement, human resource enhancement, environmental concerns, management, and training. Services are offered primarily through a network of five regional offices, staffed by field agents who work with companies individually to create the best combination of assistance.

Massachusetts Office of Business Development, Executive Office of Economic Affairs (MOBD)

Executive Office of Economic Affairs
One Ashburton Place, 21st Floor
Boston, MA 02108
Phone: (617) 727-3206
Fax: (617) 727-8797
Contact: David Lutes

(Regional offices located in Boston, Dartmouth, Lowell, Worcester, and Springfield)

MOBD - Boston (617) 727-3206	MOBD - Dartmouth (508) 997-1438	MOBD - Springfield (413) 784-1580
MOBD - Lowell (508) 970-1193	MOBD - Worcester (508) - 792-7506	

The Massachusetts Office of Business Development assists Massachusetts businesses in creating and maintaining jobs and works to attract new businesses by facilitating their relocation to or expansion within the Commonwealth. It focuses on being an easily accessible, "one-stop shopping" source of information and referral for economic development. In addition, regional offices localize the many state economic and business development services.

The regional offices offer assistance and general information to federal, state, local, and private-sector programs and financial resources. Financial specialists are on staff to direct you to lending sources that will assist businesses with their financing needs. They will connect businesses with the appropriate financing resources such as the Executive Office of Communities and Development (EOCD), Community Development Finance Corporation (CDFC), the Massachusetts Government Land Bank (Land Bank), Massachusetts Business Development Corporation, and the Industrial Services Program, each providing debt financing which is tailored to the needs of the borrower.

Office of Technical Assistance, Executive Office of Environmental Affairs (OTA)

Executive Office of Environmental Affairs
100 Cambridge Street, Suite 2109
Boston, MA 02202
Phone: (617) 727-3260
Fax: (617) 727-3827

Contact: John Raschke

The Office of Technical Assistance for Toxics Use Reduction, part of the Executive Office of Environmental Affairs, is a nonregulatory state agency whose purpose is to assist Massachusetts industry in making viable changes in their production practices aimed at reducing or eliminating the use of toxic substances and the generation of toxic byproducts.

The Tactical Training Initiative, Department of Employment and Training (TTI)

Department of Employment and Training
Policy, Planning, and Legislative Affairs
19 Staniford Street, 4th Floor
Boston, MA 02114
Phone: (617) 626-5180
Fax: (617) 727-8014
Contact: Jack King

The Tactical Training Initiative helps small and medium-sized manufacturing companies create new jobs in Massachusetts and train their workforce in new skills. Workforce training may be needed to develop new skills to adapt to new production methods or modernization of facilities. The TTI program provides job training grants as an incentive for businesses to expand employment opportunities in Massachusetts. Grants generally are between $15,000 and $50,000.

Note *This is not an all-inclusive list of state programs; rather these were judged to be most relevant to the issues identified in this study. There may be other state programs which can assist paper mills with a particular problem or question. The agencies listed above should be able to refer mills to other agencies or organizations when appropriate.*

APPENDIX B
Participants in the Paper Industry Survey

American Tissue Mills of Massachusetts
Mill Street
Baldwinville, MA 01436
508-939-5359

Bay State Paper Company
892 River Street
Boston, MA 02136
617-361-3500

Boyd Converting Company
Pleasant Street P.O. Box 287
South Lee, MA 01260
413-243-2200

Byron Weston Paper Company
776 Main Street
Dalton, MA 02166
413-684-1234

Cascades Diamond Inc.
Church Street P.O. Box 627
Thorndike, MA 01079
413-283-8307

Crane & Company, Inc
50 South Street
Dalton, MA 01226
413-684-2600

Crescent/Lee Division
P.O. Box 285
Lenoxdale, MA 01242
413-637-0156

Crocker Technical Papers
431 Westminster Street
Fitchburg, MA 01420-4700
508-345-7771

Crown Vantage
Adams Mill
115 Howland Avenue
Adams, MA 01220
413-743-0290

Custom Papers Group Inc.
1 Old Princeton Road
Fitchburg, MA 01420
508-345-2161

Decorative Specialities International, Inc.
Front Street P.O. Box 6001
W. Springfield, MA 01090

Erving Paper Mills
97 East Main Street P.O. Box 38
Erving, MA 01344
508-544-2711

Esleeck Manufacturing Company, Inc.
P.O. Box 717 Canal Street
Turners Falls, MA 01376
413-863-4326

Haverhill Paperboard Corporation
100 South Kimball Street P.O. Box 31
Haverhill, MA 01831
508-373-4111

Hollingsworth & Vose Company
112 Washington Street
East Walpole Mill
Walpole, MA 02032
508-668-0295

Hollingsworth & Vose Company
Townsend Road
West Groton, MA 01472
508-663-0295

Schweitzer-Maudit International, Inc.
Greylock Street
Lee, MA 01238-1002
413-243-1000

Mead Specialty Papers
Route 102 Willow Street
South Lee, MA 01260-0188
413-243-1231

Merrimac Paper Company
9 South Canal Street
Lawrence, MA 01842
508-683-2754

National Fiber Board
3 Depot Street
Belchertown, MA 01007
413-283-8747

Newark Atlantic Paperboard Corp.
250 Canal Street
Lawrence, MA 01842
508-687-7100

Northeast Recycling Associates Corp
350 Lincoln Place
Hingham, MA 02043
617-749-9800

Parsons Paper Company
84 Sargeant Street
Holyoke, MA 01040
413-532-3222

Perkit Folding Box Corporation
36 Poydras Street
Boston, MA 02126
617-361-1057

Prins Recycling Center
410 Rutherford Avenue
Charlestown, MA 02129
617-242-7746

PWA Dekor
642 River Street
Fitchburg, MA 01420
508-342-1080

Rising Paper Company
295 Park Street P.O. Box 565
Housatonic, MA 01236
413-274-3345

Seaman Paper Company of MA, Inc.
P.O. Box 21
Baldwinville, MA 01436
508-939-5356

Sonoco Products Company
200 South Water Street
Holyoke, MA 01040
413-536-4546

Southworth Company
Front Street P.O. Box 5006
West Springfield, MA 01090
413-732-5141

Strathmore Paper
Mill Road
Millers Falls, MA 01349
413-659-3911

Strathmore Paper
Mill Road
Woronoco, MA 01097
413-659-3911

Texon
1190 Hunington Road P.O. Box 365
Russell, MA 01071-0365
413-862-3652

The Paper People
P.O. Box 513
Westfield, MA 01086
413-568-3297

Tulip Paper Company
20 Water Street
Holyoke, MA 01040
413-535-3268

APPENDIX C
Interview Topics

1. **COMPANY BACKGROUND**
   - A Ownership (Private or Public)
   - B Number of Facilities inside and outside Massachusetts
   - C Number of Employees
   - D Employee Payroll

2. **PRODUCT INFORMATION**
   - A Type of Materials Manufactured
   - B. Volume of Product
   - C. Distribution Channels
   - D Major Process Equipment

3. **SECONDARY FIBER USAGE**
   - A Recycled Content
   - B Volume Used
   - C Pre- and Post-Consumer Content of Recycled Fiber
   - D Type Used (Mixed Office vs. Newsprint)
   - E Quality Needs
   - F Suppliers
   - G. Price Trends
   - H Availability
   - I. Alternative Supplies of Secondary Fiber

4. **INCREASING RECYCLED CONTENT**
   - A Incentives
   - B Barriers
   - C. Initiatives for Increasing Use of Waste Paper
   - D. Suggestions for Addressing Recycling Issues

5. **PROCESSES FOR HANDLING RECYCLED MATERIALS**
   - A Logistics delivery
   - B. Storage
   - C Treatment System
   - D Economics

6. **COMPETITIVE ISSUES**
   - A. Advantages
   - B Disadvantages
   - C. Current Initiatives for Increasing Competitiveness
   - D. Suggestions for Addressing Industry Disadvantages

7. **EXISTING STATE ASSISTANCE PROGRAMS**
   - A. Awareness
   - B Past Use
   - C. Current Needs

APPENDIX D
Restructuring of the Electric Utilities[22]

History of Electric Utilities in Massachusetts

The process needed to provide electricity to consumers—i.e., the generation of the electricity at power plants, the transmission of that electricity over wires, and the distribution of the electricity to end-users—traditionally has been seen by government as the basis for a natural monopoly. In combination with the traditional government-inspired obligation for utilities to serve all customers, because electric service is essential for national prosperity, the industry has been organized into vertically integrated businesses that provide exclusive service in defined areas across the country.

The Industry

The electric industry in Massachusetts is a system of exclusive service territories supported by electricity generation, transmission, and distribution assets owned by 7 investor-owned utilities ("IOU's") and 40 municipal utilities. The 7 IOU's are:

- Boston Edison Company,
- Cambridge Electric Light Company,
- Commonwealth Electric Company,
- Eastern Edison Company (a wholly owned subsidiary of Eastern Utilities Associates),
- Fitchburg Gas and Electric Company,
- Massachusetts Electric Company (a wholly owned subsidiary of New England Electric System (NEES)), and
- Western Massachusetts Electric Company (a wholly owned subsidiary of Northeast Utilities).

(An eighth IOU, Nantucket Electric Company, is currently in merger discussions with NEES).

Either directly or through affiliates, these companies own electric-generation facilities, high-voltage transmission networks, and low-voltage distribution networks. Because they control the entire process from generation to distribution, they are known as vertically integrated utilities. The municipal utilities generally are operated by the electric departments of municipal governments and presided over by elected or appointed boards.

Since 1978, qualifying cogeneration and small power production facilities (Qfs) and other non-utility generating units (NUGs) have been allowed by government to develop independent of the IOU's. They sell power in the wholesale market to the utilities that control the service area in which the Qfs and NUGs generate their power. Also, in response to the energy crisis in the 1970's, the utilities agreed to oversee the centralized dispatching of electricity (based on the cost of electricity generated) through an organization called the New England Power Pool (NEPOOL).

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[22] Information on the restructuring of the electric utility industry in Massachusetts was provided by Massachusetts Senator John D. O'Brien's (Chairman of the Joint Committee on Energy) office, in collaboration with the Division of Energy Resources.

Rates

The Department of Public Utilities (DPU), which regulates the electric utility industry in the Commonwealth, determines utility rates using a system known as "Cost of Service Rate of Return" or COS ROR. Because there is no competition which would determine a market rate, the DPU determines the cost to a utility of providing electricity in its service area and allows the utility to collect that cost from its ratepayers plus a percentage for profit. The DPU will adjust a utility's profit margin if it determines a utility is running as efficiently or effectively as possible. However, shareholders of electric utilities have traditionally seen a steady return on their investment.

Proposed Changes to the Industry

In 1978 the federal government, through the Public Utilities Regulatory Policies Act, opened the wholesale market by allowing certain "qualifying facilities" to sell electricity wholesale to the utilities that serve the territories in which the QF's are located. In August of 1995, the state DPU, through Order 95-30, mandated that the electric utilities submit plans to the Department outlining a process for opening up the retail electricity market to competition. In theory, this would let any industrial, commercial, or residential user of electricity choose which company provides their electricity service.

The DPU proposes to open the market to competition by separating the electricity-generation process from the transmission-and-distribution process. Companies would be able to build generators, whether or not those companies where utilities, and use the existing transmission and distribution wires, owned by the utilities, to transmit electricity to consumers. It has been argued that this process will encourage generators to compete for consumers based on the market price for electricity, thereby lowering the cost of electricity over the long term.

The state legislature has yet to weigh in on this issue of electric utility restructuring with legislation. However, the Joint Committee on Energy and, separately, the Joint Committee on Government Regulations have held, or will be holding, informational hearings as the process continues.